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I

SINCE my co-lecturers have dealt with the chemistry of the carbohydrates (Prof. W. N. Haworth) and the fat-soluble vitamins (Prof. J. C. Drummond), I shall confine the greater part of my remarks, as far as the vitamins are concerned, to vitamin C. Indeed, Lecture II will be devoted to a discussion of the rôle of this vitamin in disease. Throughout both lectures I shall illustrate much of what I have to say by reference to investigations carried out at the Children's Hospital.

General Nutrition

A distinguished American pædiatrician has thus expressed the difficulty of associating clinical symptoms in man with a specific deficiency in the diet and of correlating deficiency diseases in animals with disease in man (Weech 1930):—

> "The exact methods of the laboratory are not obtainable with observations on human disease. The diet of the experimental animal is chosen with meticulous care; that of the human being is dictated by geographic location, class or racial custom, individual appetite and the exigencies of economy. A diet so limited as to be deficient in one essential is liable to be defective in several."

This explains why nutritional diseases in childhood not infrequently occur in combination—e.g., rickets and scurvy, rickets and deficiency anæmia.

INFLUENCE OF ENVIRONMENT

A diet sufficient to prevent clinical signs of disease under certain conditions may be unable to do so under others; thus, one that may prevent pellagra may be rendered pellagrous by the occurrence of diarrhœa, and a diet which will prevent rickets in a negro infant living in equatorial Africa is quite unable to do so in England.

This influence of surroundings is well seen in experiments which my colleagues and I carried out over a period of three years.

In the first year (1933) three groups of rats were placed on a rickets-producing diet, one being kept in the dark, another exposed daily from 11 A.M. to 1 P.M. (G.M.T.) to the open sky but not to direct sunshine, and the third exposed for the same time to whatever direct sunshine was available. This was done for four weeks, two hours being chosen for exposure because it is about the time the average baby spends out of doors. From experiments at Toronto and elsewhere it is known that healing should begin when the sun is about 35° above the horizon, and this occurs in Birmingham for a little more than six months (say 28 weeks), in Glasgow for six months, in London for seven, and in Toronto for eight months of the year. Actually, healing only occurred in the sunshine rats from June 7th to Oct. 3rd (a period of 17 weeks), and in skyshine rats from July 24th to Sept. 26th (9 weeks).

The summer of 1933 was very sunny, and this restricted period of healing was thought to be due to the smoke pall over Birmingham. The experiment was therefore repeated in 1934, when another series of rats was exposed in the open country at the Infants' Hospital, Canwell, on the north-east side of Birmingham; curiously enough healing here was not so good as in Birmingham. Therefore last summer three series of rats were used, one on the south-west side of Birmingham on the Lickey Hills, one in Birmingham, and one at Canwell. The results show that healing is very slightly better at the Lickey than in Birmingham and considerably better in Birmingham than at Canwell.

It is clear therefore, first, that a diet that will produce rickets if the animal is kept indoors will not do so at certain times in the year if a degree of sun- or sky-shine is available; and, secondly, that the same diet is more efficacious in preventing rickets in the country south-west of Birmingham than in that to the north-east, provided that a certain time is spent out of doors. The only explanation that one can suggest for this is that the prevalent south-west winds carry the smoke from Birmingham and the Black Country to the north-east of Birmingham, and that this cuts off many of the curative ultra-violet rays.

Diet, the problems of general nutrition, and the existence of malnutrition have now become stock items of newspaper news, advertisements, and political debates. We constantly hear and see statements such as "40 per cent. of the nation is undernourished," and "starvation in a land of plenty." Malnutrition is quite easily recognised by Members of Parliament and publicists, but clinicians find it difficult to diagnose particularly in mild degrees. The state of nutrition depends not only on an adequately balanced and properly cooked supply of food but on such factors as the surroundings, geographical location and stature of the individual, monotony, fresh air, light, sunshine, cleanliness, exercise, worry, sleep, and the presence of disease. Some also require more of certain articles of diet than others; for instance, some infants and adults need large amounts of iron to prevent an iron-deficiency anæmia. Again, I have seen a child with rickets who required ten times the normal dose of vitamin D to produce a cure and to prevent recurrence, and I have seen a baby develop scurvy after taking 1–2 oz. of orange juice daily for months.

Cathcart (1937) defines good nutrition as "the state of well-being which characterises the individual who is physically and psychologically sound," and thinks that if it is desired to limit the conception of nutrition to the effect of food it would be better to substitute for it the word "alimentation." An individual may be well fed and yet be badly nourished, since for good nutrition it is essential that the diet supplied should be adequate in all respects, that it should be normally absorbed from the intestine, and that the body should be able to utilise it after absorption. The importance of the first factor is self-evident; as to the second, the effects of defective absorption reach their climax in cœliac disease, in which the sufferer, even on a diet that everyone would pass as completely adequate, may develop a whole series of deficiency diseases—e.g., rickets, tetany, cataract, xerophthalmia, scurvy, beri-beri, dermatitis, microcytic and macrocytic anæmia. Under this heading may possibly be classed those who seem to require larger amounts than the normal person of such dietary constituents as iron and the various vitamins. With regard to the third factor, defective utilisation is seen in such widely different diseases as diabetes, von Gierke's disease, the lipoidoses, cystinuria, alkaptonuria, pentosuria, congenital porphyrinuria, and

* Withering lectures (abridged) delivered before the University of Birmingham on May 11th and 13th, 1937.

achrestic anæmia, all of which can strictly be regarded as nutritional diseases.

ABSENCE OF STANDARDS

One of the great difficulties in discussing nutrition is the absence of any definite standards. Deficiency diseases are accepted as definite evidence of malnutrition, yet it is common clinical experience that most infants with scurvy seem to be well nourished and well developed An even more contradictory state of affairs sometimes occurs in rickets; for the development of this disease growth is an absolute essential, and hence the over-fed infant who grows rapidly develops it. Are we therefore to accept overfeeding as evidence of malnutrition? The usual standards of nutrition are based upon height, weight, vital capacity, dynamometer tests, hæmoglobin estimations, &c., but these, although useful, are all unsatisfactory. For instance, "according to the Royal Air Force Central Medical Board, every member of the 1933 Everest expedition with one exception was under average weight, and this exception was taken seriously ill" (Smythe 1935). Growth may be impaired if the diet is inadequate, but, as Cathcart pointed out, stature is usually an inherited characteristic. Murk Jansen (1921) maintained that tallness was often the expression of "feebleness of growth," and that the outstandingly tall person in the family was the feeble one. Again, growth during an illness that entails some weeks in bed is often remarkable. Growth occurs particularly during the first two years, from five to seven years, and at puberty, and, although it may perhaps be accelerated during these periods by diet or over-feeding, the final adult stature does not appear to be increased. Over-feeding is more likely to lead to increased weight than to increased growth, and I believe the question asked two thousand years ago comes near to the truth: "Which of you by taking thought can add one cubit unto his stature?"

Is there any clinical evidence of malnutrition apart from clear-cut deficiency diseases? Every clinician has his own standard—in reality only an impression—which varies from year to year. I have formed the impression that there is much less malnutrition than there was 25 years ago. Scurvy is certainly far less common, and severe rickets is now rarely seen. Malnutrition, however, does exist, and although many public-school boys and their parents regard the school diets as grossly inadequate, the children of this class show less than those attending elementary schools in depressed areas.

It has been suggested that the fall in the death-rate that has taken place within recent years is evidence against the existence of malnutrition, but the deduction is hardly justified as so many other factors must have influenced the decline—for instance the triumphs of preventive medicine and such clinical triumphs as the insulin treatment of diabetes and liver treatment of pernicious anæmia.

These are a few of the reasons why I find it difficult to have any standards of nutrition and malnutrition, nevertheless our knowledge of nutrition and nutritional diseases is becoming greater every day, although it is sometimes impossible to see the clinical applications of many of the discoveries. Every now and again, however, some master hand like Prof. Drummond takes the pieces of this jig-saw puzzle and fits them together into a perfect picture. This is the age of vitamins, and even in the age itself there are certain cycles. We have been living in a period of A and D, but recently pride of place has been usurped by C, and there are signs that C in its turn will ultimately give place to B.

Diseases of the Erythron

Some idea of the complexity of the problem of nutrition may be obtained by a study of the nutrition and nutritional diseases of a single cell, and as an example we may take the red blood-cell—surely in structure the simplest cell in the body, being only an envelope with a stroma containing a solution of hæmoglobin in its interstices—yet, just because it does contain hæmoglobin, one of the most complex in its nutrition, and subject to striking nutritional diseases.

The red blood-cell arises from the endothelial cells of the intersinusoidal capillaries which connect the large sinuses of the bone-marrow. In these capillaries circulation is practically stagnant and the red cells which are budded off pass through various stages until they are mature, when they become separated from one another by plasma trickling between them, the capillary opens, and they are swept into the general circulation. Any call for large numbers of red blood-cells such as occurs in anoxæmia due to living in high altitudes, from severe hæmolysis in acute hæmolytic anæmia, severe hæmorrhage, and congenital heart disease, stimulates the capillary and sinus circulation and large numbers of cells—many of them immature—are discharged into the circulation.

Anoxæmia thus affects the red blood-cell in two ways: first, local anoxæmia in the capillaries is almost certainly the factor which causes the endothelial cells of the capillaries to bud off the primitive red cell; secondly, general anoxæmia causes the cell factory to discharge its products, perhaps before their due time, into the circulation.

The intermediate stages through which the red cell passes from the endothelial cell to the erythrocyte can be recognised and have been designated as megaloblast, macronormoblast, normoblast, and reticulocyte. With each successive change the cell becomes smaller and finally loses its nucleus when the normoblast becomes the reticulocyte. The stroma is probably built up in the megaloblast stage, the hæmoglobin being added later. The vast majority of cells normally in the circulation are derived from the normoblast stage, because one megaloblast will give rise to a large number of normoblasts, which in their turn may multiply indefinitely. To ensure that this maturation takes place and to enable the nucleus to elaborate hæmoglobin, certain substances in addition to oxygen have to be supplied to the bone-marrow. Thus, to ensure maturation from the megaloblast to the normoblast the "hæmatinic factor" produced by the interaction of an extrinsic factor present in the food with an intrinsic factor in the gastric juice is necessary, and in its absence maturation is held up at the megaloblast level and a megalocytic hyperchromic anæmia develops. For the maturation of the normoblast to the erythrocyte it is usually stated that iron, copper, and possibly some other metals, vitamin C, and thyroxin are required, and that a microcytic hypochromic anæmia develops if these are not supplied, but from our observations it is clear that this statement requires modification and extension. It is our view that, except for the congenital microcytosis of acholuric jaundice and of sickle-cell anæmia, any obvious degree of microcytosis always indicates a deficiency of hæmoglobin. This lack of hæmoglobin also is essentially due to iron deficiency, although it may be caused by the absence of certain food substances containing the pyrrol ring, and possibly also calcium, copper (at any rate experimentally), and perhaps some other metals that act as mobilisers or

catalysts of iron. Further, we believe that anoxæmia, ascorbic acid, and thyroxin act throughout the whole range of maturation from reticulo-endothelial cell to erythrocyte.

Hæmoglobin is an iron porphyrin, its analogue, chlorophyll, being a magnesium porphyrin. The porphyrins are made up of a number of five-carbon-atom rings—the pyrrol ring—and opinions vary as to whether the pyrrol ring can or cannot be synthesised in the body. Some cases of deficiency anæmia are due to pyrrol deficiency, and there is some indirect evidence from the life of the red blood-cell that the body has a mechanism designed to avoid undue loss of the pyrrol ring nucleus. Both of these considerations suggest that the pyrrol nucleus is not synthesised in the body, or at any rate not in sufficient amounts for the body needs. The life of the red blood-cell after its discharge into the circulation has been variously estimated as from three weeks (or less) to three months, and ultimately it is either broken up in the blood stream and engulfed by the scavenger cells of the reticulo-endothelial system, or captured alive and devoured by these cells. In either case it achieves a degree of immortality, for these same reticulo-endothelial cells lay hold on its hæmoglobin, separate the iron from it, and leave the pyrrol compound bilirubin, both of which substances are used for the equipment with hæmoglobin of generations of red cells as yet unborn. The iron and bilirubin are transported to the liver where the iron is stored as hæmosiderin, and the bilirubin excreted as bile pigment. Some of the latter is, however, reabsorbed into the circulation, thus conserving some of the body's pyrrol ring compounds for use in hæmoglobin building. Incidentally it is now claimed that the stores of iron in the liver of the new-born infant are not very large, and that the greatest store of iron at birth is in the blood, but it is the hæmolysis occurring after birth that furnishes the store of iron necessary for the formation of red blood-cells during the lactation period.

I will now deal with the effects of a deficient supply of some of the factors other than the "hæmatinic factor" required for the nutrition of the erythron.

IRON DEFICIENCY

I have stated that an obvious microcytosis and a low colour-index mean essentially a deficiency of iron in the body. This microcytosis apparently occurs so that the available hæmoglobin shall be used to the greatest advantage, since, if this is distributed in small cells, a greater total surface of hæmoglobin is presented to the blood stream and therefore its oxidation functions can be carried out better than with cells of normal size.

We have devised a diet for rats which, although somewhat deficient in iron, is complete in other respects and contains enough iron to prevent any lowering of the hæmoglobin. Rats fed on this diet have a normal amount of hæmoglobin, but show polycythæmia and microcytosis, and when given adequate amounts of iron their red cells become normal in size and number. This indicates that the first signs of an iron-deficiency anæmia are polycythæmia and microcytosis. The next stage in the development of anæmia is, of course, a reduction in the hæmoglobin, followed later by a smaller reduction in the number of cells. This phenomenon in the rat is occasionally paralleled in children receiving iron treatment for nutritional anæmia. In these shortly before complete cure is achieved the red cells may be found to be about 6,000,000 per c.mm., although the hæmoglobin is still below normal, but when the latter reaches normal figures the red cell count also becomes normal. The progeny of rats fed on this defective diet develop a microcytic hypochromic anæmia shortly after birth, which, in its turn, can also be cured by the adequate administration of iron, thus showing that the nutrition of the mother affects the nutrition of the erythron of her fœtus. Some workers on anæmia say that results obtained in rats are not evidence of what will occur in the human fœtus and child, because the rats are not in normal surroundings but in captivity—a remark that would apply to many mothers and babies amongst the poorer classes—and because the rat increases in weight much more rapidly than the normal baby. The babe, however, as well as the rat, increases threefold in a similar comparable period—e.g., from birth to the end of the lactation period. Moreover, the results obtained with rats in nutritional anæmia can be paralleled so often with those obtained in the human being that any results in the rat must be scrutinised very carefully before they are rejected. Further, if certain methods produce specific results in the rat that are identical with those in the child, the inference that the same process is at work is difficult to refute. We know that hypochromic anæmia occurs in pregnant women as a consequence of the persistence of a pre-existing anæmia, or when inadequate amounts of iron are absorbed from the alimentary tract, owing to a restricted dietary or gastric anacidity, and that in the last three months of pregnancy the "development of blood in the fœtus creates 'blood loss' for the mother no less real than if the contents of the fetal circulation had escaped from the mother through an external hæmorrhage" (Castle and Minot 1936). It is surely reasonable to assume, therefore, that at times the fœtus may suffer, and that when nutritional anæmia develops abnormally early in the baby, it is due to iron deficiency in the mother as in the rat experiments I have described.

The effect of an adequate iron intake on the mother's blood before and after delivery was shown by R. J. Gittins (Smallwood 1936).

> The hæmoglobin of two groups of women was estimated during pregnancy and after delivery and the hæmoglobin values of their infants were followed for the first six months of life. To one group of 59 women, gr. 45 of iron and ammonium citrate were given daily for from one to three months before delivery, the other group of 106 women not receiving any iron. The hæmoglobin values of a control group of non-pregnant women in the same social class were also estimated.
>
> The results showed three things:—
>
> (1) The prevalence of iron-deficiency states resulting in the development of hypochromic anæmia of pregnancy, which continued to a lesser degree after delivery; (2) the value of adequate doses of iron in preventing that anæmia; (3) infants born to the group of mothers that were given iron had a definitely higher hæmoglobin at each age-period than those born to the mothers who had none.

Both experimental and clinical observations, therefore, indicate: that a deficient supply of iron to the bone-marrow first produces microcytosis and polycythæmia, and if the supply is still more deficient a hypochromic microcytic anæmia; that an inadequate supply of iron during pregnancy may lead to hypochromic anæmia of the mother and the birth of a child who becomes anæmic shortly after birth; and, finally, that the administration of an adequate supply of iron to expectant mothers will prevent or cure the hypochromic anæmia of pregnancy, and that the babies born of such mothers will, throughout

infancy, show higher hæmoglobin values than those born of mothers suffering from hypochromic anæmia.

UTILISATION OF IRON

Castle and Minot (1936) maintain that iron and the liver factor in their respective types of anæmia represent true replacements of some deficiency because they are only of value in their own type of anæmia, and never lead to over-production and a polycythæmia vera.

In dogs made anæmic by repeated bleeding, Whipple and Robscheit-Robbins (1936) found that iron given intravenously was accounted for quantitatively by the amount of hæmoglobin formed; for instance, 10 mg. of iron produced 3 g. of hæmoglobin the iron content of which is 10 mg.—a true replacement of an existing deficiency. On the other hand when iron was given by mouth the optimal dose showed only 35 per cent. utilisation, and with very large doses only 5 per cent. was utilised in the formation of hæmoglobin.

Much the same results have been obtained in man, thus Heath, Strauss, and Castle (1932) treated a number of adults suffering from hypochromic anæmia by injections of iron and also found that 10 mg. of iron produced 3 g. of hæmoglobin—or a rise of 1 per cent. in hæmoglobin only required the addition to the circulation of gr. $\frac{1}{4}$ of metallic iron. In hypochromic anæmia treated with large doses of iron the hæmoglobin increases from 1 to 2 per cent. per day. Assuming the increase to be 2 per cent., only gr. $\frac{1}{2}$ of iron are required each day, yet gr. 90 of iron and ammonium citrate—the amount usually administered daily—contain gr. 30 of iron.

Why is it necessary, then, to give large doses of iron? Brock and Hunter (1937) have demonstrated that these large amounts are well absorbed but that there is a big discrepancy between retention and utilisation. Brock (1937) concludes that the administration of an excess of iron leading to a great accumulation in the tissues may be more effective in certain cases of hypochromic anæmia than the much smaller doses that would be enough for actual hæmoglobin formation. He suggests two possible reasons for this: first, that the presence of some potentiator such as copper is necessary, which is not present in all iron preparations or possibly present in insufficient quantity; secondly, that large amounts of iron present in the intestine may by altering the chemical environment aid the absorption of other substances necessary for hæmopoiesis in iron-resistant individuals. There is, however, a third possibility that the ingested iron is stored in the liver and requires some other substance than copper to mobilise it for use in hæmoglobin building.

Although the hæmoglobin of infants during the lactation period can admittedly be raised by the administration of iron, it is sometimes asked whether this is advisable; whether the usual figure of 70–75 per cent. at 6 to 9 months should not be regarded as the normal, rather than the 84 per cent. or thereabouts to which it can be raised by giving iron. The statement of Castle and Minot that iron only replaces a deficiency and never produces polycythæmia vera justifies the procedure, for if the hæmoglobin can be raised by this method, the existence of a deficiency is proved. A further justification is the observation of Helen Mackay (1931) that iron-fed babies show an increased freedom from infections.

BILE PIGMENTS

Though microcytosis usually means an iron deficiency, an inadequate supply of the pyrrol ring also limits the amount of available hæmoglobin, and therefore produces microcytosis. This is a rare occurrence, since the diet usually contains an adequate supply of pyrrol compounds and the pyrrol ring is conserved by the body as already described; nevertheless anæmia of the microcytic type can occasionally be cured by the administration of bile pigments, indicating an inadequate supply of pyrrol bodies. This has been shown in Witts's anæmia by Patek and Minot (1934) and by ourselves in a few instances of nutritional anæmia of infants. Patek and Minot found that they usually had also to give small doses of iron, but that the amount required was only about a tenth of the normal dose needed for the cure of idiopathic nutritional anæmia of adults. We have, however, been able completely to cure some cases of nutritional anæmia of infants by the daily administration of 0·5 g. of bile pigments. Patek (1936) also found that chlorophyll would sometimes produce a cure, but that at other times it had to be augmented with iron. Rarely, then, nutritional anæmia may occur from deficiency of pyrrol compounds in the body, but for such compounds to produce a cure the body must contain sufficient stores of iron.

COPPER AND OTHER METALS

The rôle of copper in the maturation of the red cell is as a mobiliser of iron, and it has been stated that cobalt, manganese, zinc, vanadium, and other metals are also essential for this purpose, though there is no clinical evidence of the occurrence of a nutritional anæmia as a result of shortage of these other elements. In rats, Hart and his colleagues showed that pure ferric chloride did not cure nutritional anæmia, but that the iron so given was stored in the liver and was only mobilised for building into hæmoglobin when copper was administered (Elvehjem and Sherman 1932). A nutritional anæmia due to lack of copper is the greatest rarity, but Hawksley (1934) reports the case of an infant suffering from hypochromic microcytic anæmia which was cured by the administration of copper sulphate, and we (Parsons and Hawksley 1933) have also recorded instances where the giving of copper in addition to iron has accelerated recovery. Fortunately only small amounts of copper are required by the red cell and practically all medicinal preparations of iron contain a sufficient amount; indeed, Prof. Haworth tells me that it is impossible to prepare an iron salt without a trace of copper. The amount necessary for cure is less than 0·025 mg. per day, as we have been able to cut the intake down to that amount and still produce a complete cure of nutritional anæmia. Nevertheless Elvehjem (1937) still maintains that to obtain the maximum regeneration of hæmoglobin in anæmic children it is necessary to give 1 mg. of elemental copper for every 25 mg. of elemental iron.

CALCIUM AND IRON

I have mentioned that a deficiency in calcium might possibly result in microcytosis and anæmia, in which case it would appear to be the result of the interdependence of calcium and iron metabolism. I can only indicate here a few of the possibilities of this relationship.

First: the metabolism of iron and calcium is very similar. They are both absorbed from the same part of the alimentary canal, the upper portion of the small intestine; both require an acid medium for their adequate absorption and therefore are less readily absorbed if achlorhydria is present; if too much phosphate is present in the small intestine both metals form insoluble salts and their absorption is impaired. There are, however, certain points of difference; thus, by limiting the amounts of calcium in the food it is easy to produce a negative calcium balance, but there is no definite evidence that a negative

iron balance can ever be produced by limiting the iron intake. Again, sometimes an infant develops an iron-deficiency anæmia shortly after birth, although its mother, during and after pregnancy, is free from any signs of anæmia. In other words, she can conserve some of her iron at the expense of the fœtus, but on the other hand she is quite unable to withstand the exorbitant demands of the fœtus for calcium. This retention of iron by the mother does not always occur ; more frequently the parallel between iron and calcium remains true and the child is normal at birth, although the mother may have become profoundly anæmic. Finally, with both elements both mother and child may be affected, thus, the mother may develop osteomalacia and the child show active rickets when born, or both mother and infant may show iron-deficiency anæmia.

Secondly : in certain severe and prolonged erythronoclastic or erythro-leucoblastic anæmias decalcification of the bones and a negative calcium balance occurs. This has been presumed to be due to the necessity for providing larger areas for red bone-marrow, and it is found in certain chronic hæmolytic anæmias, such as acholuric jaundice, Cooley's anæmia, sickle-cell anæmia, and a rare form of hæmolytic anæmia studied by Smallwood and myself.

Thirdly : Brock and Diamond (1934) have proved that in rats the addition of large amounts of ferric chloride will convert a non-rachitogenic diet into a rachitogenic one. They have shown that this is not due to the chlorine radicle nor to the ferric chloride affecting the *p*H of the intestine, and also that this "iron rickets" can be prevented by the addition of excess phosphate enough theoretically to combine with all the ferric chloride as ferric phosphate. These facts, together with the presence of a low serum phosphorus in the iron-rickets rats, are strong evidence that large amounts of iron in the bowel by forming ferric phosphate prevent the proper absorption of phosphorus, and therefore the normal deposition of the calcium phosphorus compound in the bone.

Fourthly : by feeding rats on a diet extremely restricted in all the inorganic constituents an almost similar picture is produced to that obtained by feeding them on a minimal iron diet—viz., polycythæmia, microcytosis, and a reduction of hæmoglobin. This diet is extremely deficient in calcium and to a lesser degree in potassium, sodium, phosphorus, manganese, and chloride, and contains less iron than the rat is supposed to require. At first sight it appears that these changes are due to lack of iron, and the addition of iron to the diet does produce a cure, but the addition of adequate amounts of calcium also prevents the occurrence of these changes or cures them if they are present. Another interesting point is that only slight blood changes occur if edestin (a protein that contains little or no phosphorus) is substituted for casein (a phosphoprotein) in the diet, suggesting that the calcium-phosphorus ratio in the bowel may be a factor in iron absorption and therefore in erythropoiesis (Smith and Schultz 1930, Swanson and Smith 1932, Orten and Smith 1934, Swanson, Timson, and Frazier 1935, Orten, Smith, and Mendel 1936). We have attempted to apply these findings to clinical medicine by giving to children suffering from the hypochromic anæmia of cœliac disease large doses of calcium chloride for a period of three to four weeks, and then for a further period adding a minimal amount of iron (one-tenth of the usual dose), but in neither case has there been any significant effect on the anæmia.

These experimental observations raise two important clinical questions. First, what effects do large amounts of iron in the bowel have on the calcium-phosphorus ratio in the blood, and on the production of rickets ? Secondly, what effects do large amounts of phosphorus in the bowel, such as may be produced by the consumption of considerable quantities of milk, have on the absorption of iron and on the metabolism of the red blood-cell ? The answer to the first question is that the amounts of iron given to the rats were in relation to body-weight about twenty times the maximum dose usually given to the child, and therefore the risk of producing rickets is negligible, although it is conceivable that large doses of iron given to a child receiving a diet low in phosphorus might do so. Secondly, nutritional anæmia in late infancy in the artificially fed child is said to be due to the deficiency of iron in cow's milk as compared with breast milk, a deficiency which, according to some authorities, has been over-rated. It may, however, be due in part at any rate to the restriction of iron to the bowel by the presence of phosphorus. There is another and perhaps more important clinical point—namely, its bearing upon the regeneration of blood after gastric or duodenal hæmorrhage. It is a well-recognised fact that in treatment by a prolonged milk dietary the recovery of the blood is a very slow process, not greatly accelerated by the administration of iron salts. Recently, however, Meulengracht has shown that the blood returns to normal much more quickly by his method of dietary—which includes the early administration of meat, fish, and eggs—than on the usual milk diet. A possible explanation of this is that the presence of considerable amounts of phosphorus in the milk prevents the absorption of iron, and that the absence of large quantities of milk in the Meulengracht diet allows of greater absorption of the iron present in the diet or given medicinally. This effect of milk may be exaggerated by the practice of administering alkaline powders. Kellog and Mettier (1936) found that giving an iron-rich diet to 14 men anæmic from loss of blood from peptic ulcer had no effect on the formation of hæmoglobin when the upper part of the alimentary tract was made alkaline by a modified Sippey régime, but that after the alkalis were discontinued it had an effect comparable to that produced by adequate therapeutic doses of iron. Some clinicians now do not use alkaline powders in hæmatemesis or melæna unless the patient complains of pain.

THYROXIN

The action of thyroxin on the red blood-cell is well demonstrated by the blood findings in cretinism. The pallor of cretinism and myxœdema suggests a degree of anæmia greater than that usually revealed by an examination of the blood, but in 12 cretins under our care we found anæmia in every case.

This anæmia was usually orthochromic in type, with cells of normal size, but in two instances the cells were macrocytic in type, one being also hypochromic, and in only one case which had a combined thyroid and iron deficiency was microcytosis and hypochromia found. Radiological examination of the long bones of cretins shows very characteristic findings due to aplasia of the marrow and arrest of growth. With the complete or partial aplasia of the marrow the maturation of the red cell is completely or partially arrested, and this may occur at the megaloblastic or normoblastic level, producing a macrocytic or normocytic anæmia. Under thyroid treatment the marrow becomes active, growth is resumed, the red cell matures normally, and the anæmia is cured.

Difficulty is sometimes experienced in persuading a cretin to take solid food, and a milk diet may be continued for a considerable time beyond the normal lactation period. An iron deficiency may then also be present, the cells become microcytic in type, and iron as well as thyroid be necessary for complete cure.

Similar hæmatological findings are found in myxœdema ; thus Lerman and Means (1932a) found a hæmoglobin of under 70 per cent. in about half of their 52 patients, and occasionally the blood picture strongly suggested pernicious anæmia, probably the megalocytic anæmia that I have described in cretins. Moreover, as in cretinism, the dietetic intake in myxœdema may be deficient and a macrocytic

anæmia develop, in part from the absence of the extrinsic factor in the diet. Conceivably at times the intrinsic factor may also be lacking, because according to Lerman and Means (1932b) about half the subjects of myxœdema have gastric anacidity. In support of this conception and the existence of a mixed thyroid and "pernicious" anæmia, these workers found that there was much reticulocytosis and improvement of the blood after the administration of liver extract, and before the basal metabolic rate showed any response to thyroid medication. Similar results have been found by Holbøll (1936) in 28 patients with myxœdema. In 13 the hæmoglobin was below 70 per cent., 1 had a typical pernicious anæmia, 4 a colour-index over unity, and the others a normal or subnormal index. Thyroidin produced an improvement in all cases, but to obtain a hæmoglobin of over 80 per cent. it was also sometimes necessary to give iron.

VITAMIN C

The effect of vitamin C upon the maturation of the red cell parallels that of thyroxin. As a result of an inadequate intake of this vitamin we have observed anæmia both of the orthochromic normocytic type and of the macrocytic type, both forms being cured by the administration of ascorbic acid without other alteration in the diet and without giving any drug. Such results seem to furnish conclusive evidence that vitamin C is essential for the normal maturation of the red cell, yet there is no shadow of doubt that severe scurvy may occur without any sign of anæmia. It is natural, therefore, that opinions vary about the existence, frequency, and specificity of the anæmia in scurvy. Nowadays, owing to one of the "nutritional" triumphs of preventive medicine, it is rare for any one observer to see many cases of infantile scurvy. I have therefore been fortunate in seeing three instances of orthochromic normocytic anæmia, two of normocytic and slightly hypochromic anæmia, and two of macrocytic anæmia, all of which were cured by ascorbic acid, in a series of 14 children suffering from scurvy. These children demonstrated not only the specific effect of vitamin C and the uselessness of iron as a curative agent but also that anæmia is not always present in severe infantile scurvy—a fact that is difficult to explain, though it may be that under some conditions the bone-marrow suffers more damage than under others. After all, cases of severe scurvy differ considerably in their clinical manifestations, for instance, exophthalmos although a characteristic is nevertheless a rare sign, and factors such as injury or local infection may determine the appearance of certain symptoms. How otherwise can one explain the presence of severe manifestations in the legs and the escape of the upper limbs, or hæmorrhage around erupted and erupting teeth and their absence in the gums if the teeth are unerupted? Anæmia is then characteristic but not universal when the intake of vitamin C is inadequate. Scurvy in the adult is apparently more often associated with anæmia, since it is reported as occurring in 70–80 per cent. of those patients who have had their blood examined. The characters of the anæmia are similar to those in the infant.

SUMMARY

Thyroxin and vitamin C, therefore, are factors in normal red cell metabolism, and their action on the cells of the bone-marrow is throughout the whole range of maturation of the red cell from reticulo-endothelial cell to adult erythrocyte, and not restricted to a small portion of its maturation. Further, the anæmia of scurvy, cretinism, and myxœdema results from a slowing down of the whole process of erythropoiesis, which may become so great as to produce degeneration and aplasia of the red bone-marrow with the result that an anæmia, usually orthochromic and normocytic, is produced. At times, however, there is a disproportionate slowing of red cell development at the stage of maturation of megaloblast to normoblast, and a macrocytic anæmia occurs. In scurvy associated with large hæmorrhages into the tissues and from the mucous membranes a post-hæmorrhagic blood picture becomes superimposed, and the anæmia becomes hypochromic; conceivably in extreme cases it might even become truly microcytic. Finally anæmia in scurvy or cretinism may be due to a mixed deficiency of both vitamin C or thyroxin and iron.

This concludes my review of the factors that influence nutrition of the red blood-cell and in the absence of which there is nutritional disease—anæmia—of the erythron. It gives some idea of the great complexity and importance of intracellular chemistry in nutrition.

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SYMPATHETIC DENERVATION OF THE UPPER EXTREMITY

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The end-results of cervicothoracic ganglionectomy are not satisfactory. Such has been the experience of many surgeons who have followed their patients for a sufficient length of time. Whether this operation be done for the Raynaud phenomenon or for other circulatory disturbance (e.g., acrocyanosis) the immediate satisfactory result is likely to change with time to a disappointing relapse. This relapse, which occurs usually from 6–9 months after the operation, differs, it is true, in extent in different patients. In some the relapse is total, but in the majority it is not so complete and the patient may be satisfied with what has been gained. But when these patients

are examined by clinical tests and submitted to trial by nerve-block and sweating, the denervation of the limb is seen to be far from complete. This, at least, is my experience in a recent review of 34 cervicothoracic ganglionectomies done between 1931 and 1934.

It is otherwise with the operation of lumbar cord ganglionectomy done for lesions of the lower limb. Here the results are complete and permanent. My own cases operated upon in 1931 have recently been seen and all show that the denervation remains complete. Other writers have reported the same result after intervals longer than this. It is unlikely that Raynaud's disease in the hand differs in any material way from Raynaud's disease in the foot; it is obvious that the explanation of failure in the hand and success in the foot must be sought in the anatomy of the parts and in the technique of the operation.

On anatomical grounds it is plain that lumbar cord ganglionectomy is a preganglionic operation because the vasoconstrictor fibres are divided before they have reached the sacral ganglia which hold the cell-stations for the territory of the sciatic nerve. But if the cervicothoracic ganglion be removed the cell-stations for the arm are cut away; the peripheral fibres degenerate and the operation is postganglionic. It seems wellnigh certain that in these facts we have the explanation of success in the foot and failure in the hand. In this connexion the following case-history is of much interest:—

A woman, aged 27, suffered from Raynaud attacks in all four extremities. The disease had rendered her quite unable to earn her living as a bottle-washer. On April 30th, 1932, a bilateral lumbar cord ganglionectomy was done—the result was completely satisfactory and remains so after five years. On Feb. 16th, 1933, the cervicothoracic ganglion of the right side was excised; the operation was easy and the removal was complete. Within twelve months the Raynaud attacks returned in the right hand as badly as ever and they persist to the present. On April 22nd, 1933, an attempt was made to excise the left cervicothoracic ganglion by the posterior route. The thoracic cord was divided below the ganglion but an unusually high location of the ganglion prevented its removal owing to the roots of T.1 and C.8 lying between the operator and the ganglion. The wound was closed; all that had been done was a division of the thoracic cord below the ganglion. The result in this arm was good and remains after four and a half years.

This case shows that a complete ganglionectomy relapsed within twelve months but that a preganglionic section of the thoracic cord gave a good and lasting result.

Another observation of interest in this connexion is that in a patient who has had ganglionectomy done for Raynaud's disease in the hand the condition of the hand may have relapsed completely in six months, but the Horner syndrome remains and is undiminished at the end of five years. The stellate ganglionectomy is postganglionic for the arm and fails but is preganglionic for the eye and its effect remains unabated.

This clinical approach to the subject led me to devise and practise, for the upper extremity, a preganglionic type of operation which I described to the British Association of Surgeons in May, 1935. Long before this, the physiological approach had been shown by Lewandowsky (1903) and subsequently elaborated by Freeman and others (1934), Smithwick and others (1934), and by Grant (1935). The subject was reviewed in a comprehensive paper by White and others (1936). Recent work by Ascroft (1937) in monkeys still further confirms the opinion that in the surgery of the sympathetic nervous system a preganglionic is better than a postganglionic section.

THE PREGANGLIONIC OPERATION

The operation which I have practised in all cases since February, 1935, is a division of the thoracic ganglionated cord below T.3 ganglion with division of the rami which enter the cord from T.2 and T.3. The cervicothoracic ganglion and the white ramus from T.1 are left intact. The extent of the section is shown in Fig. 1. The illustration is purely diagrammatic and for the sake of clearness nothing but the essentials is shown. It is not my purpose to deal at any length with the physiology of this preganglionic section. This has already been done in two recent and important papers (White, Okelberry, and Whitelaw 1936, Simmons and Sheehan 1937) but clinical and experimental observations on patients operated upon by this method bring out two points.

The first is that the denervation of the hand corresponds to that effected in the foot and is pre-

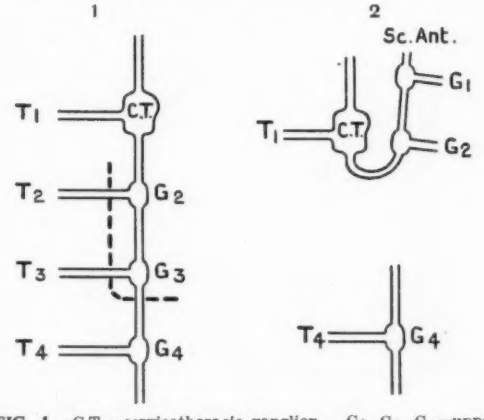

FIG. 1.—C.T. = cervicothoracic ganglion. G_2, G_3, G_4 = upper ganglia of the thoracic cord. T_1, T_2, T_3, T_4 = upper thoracic white rami. Interrupted line = line of section.

FIG. 2.—Sc. ant. = cut end of thoracic cord sutured to stump of scalenus anticus.

ganglionic in its character. This shows that the cell-stations for the arm are mainly and probably entirely in the cervicothoracic ganglion.

The second point is that if the white ramus of T.1 be left intact no trace of Horner's syndrome appears. It would seem that all the fibres of T.1 white ramus go headwards. The finding of Langley that, in the cat, the upper limit of vasoconstrictor fibres for the arm is T.2 is thereby confirmed for man.

I have done this operation on 25 occasions since February, 1935. The results have proved very gratifying in comparison with those obtained by cervicothoracic ganglionectomy. The majority of these cases are, as yet, hardly of sufficient age to warrant an opinion that the result is permanent, but the two following cases may be quoted. They represent respectively the first case of acrocyanosis and the first case of Raynaud's disease in which I did the preganglionic operation.

1. A girl of 19 years, a shop assistant, had suffered since 14 years of age from acrocyanosis and pernio of both hands. She was worse in the winter, but never entirely free in the summer; latterly she had been unable to follow her employment. A bilateral preganglionic operation was done in February, 1935. Both hands have been of good colour, warm, and dry since the operation and remain without change 2½ years after the operation.

2. A woman of 32, a domestic servant, had suffered for many years from typical and severe Raynaud's disease; latterly she had been unable to work. In January, 1936,

she underwent a bilateral preganglionic section. Since that date there has been no further attack and both hands are normal at the end of 21 months.

In three of the earlier cases some degree of relapse has been seen. One of these, a bilateral relapse, yields evidence which suggests that regeneration of sympathetic fibres has occurred. Brief details of this case are:—

The patient, a domestic servant aged 19, had suffered from childhood with severe acrocyanosis and pernio of the hands. A bilateral preganglionic section was done in June, 1935. The right hand relapsed three months and the left hand five months after the operation and both are now "almost as bad as ever." Investigations of this patient by ulnar nerve-block and by sweating point to a high degree of regeneration.

From the facts of this case it is clear that insufficient attention had been paid at the time of operation to the almost uncanny power of regeneration which the autonomic system is known to possess. Since this experience I have in all cases either ligatured or put silver clips on the cut ends and have slung the upper end to the scalenus anticus muscle. This manœuvre is depicted in Fig. 2. Since doing this none of the cases has, so far, shown any relapse.

THE SURGERY OF ACCESS

The operation is done by the anterior approach. This route has been well described by several writers, but the following additional points may prove of value to any surgeon attempting the operation for the first time.

The clavicular head of sternomastoid varies considerably in its lateral extent and should be divided in its outer third or even half. The phrenic nerve is best protected by retraction with a broad piece of soft tape and the same method serves admirably for the subclavian artery at a later stage of the operation. The scalenus anticus must be divided at its insertion but if a few of the most medially placed fibres are left intact any danger of injury to the thoracic duct is avoided. The subclavian artery is freed from any of its branches which interfere with full downward retraction of the main trunk; it is most important that the superior intercostal artery be ligatured. This artery arises from the posterior aspect of the subclavian artery in its second stage; ligature of this branch renders almost bloodless the field of operation around the ganglion and the upper thoracic cord. The utmost care must be taken to avoid crude retraction of the brachial plexus. Downward displacement of the parietal pleura is best effected by pressure of the forefinger or of a gauze swab in a holder. If it prove difficult, it is safest to pick up the more resistant strands of Sibson's fascia on a nerve-hook and divide them with the knife. Good illumination is essential and is best obtained by a Cameron light which when introduced into the depths of the wound serves as a useful depressor of the pleura. Finally, in dividing the cord, watch must be kept for the possible existence of a Kuntz nerve, an occasional contribution from the second thoracic ganglion to the brachial plexus, running lateral to the cervicothoracic ganglion to reach the lowest trunk of the plexus. This contribution is postganglionic and if encountered must, of course, be saved. It is, however, rare; I have seen it twice only in 49 operations.

An operation, very similar to the above but done through a posterior incision, is described by Smithwick (1936). This writer also insists on the need for adequate safeguard against regeneration. There is good reason to hope that a preganglionic section carried out by one or other of these methods will give results in the hand equal to those so consistently obtained in the foot. If this prove to be the case the surgical treatment of vascular lesions of the upper limb will be placed on a surer basis. At least one can state with confidence that in circulatory disturbances of the upper extremity cervicothoracic ganglionectomy should no longer be done.

SUMMARY

1. A comparison is given of the results obtained by ganglionectomy in the upper and lower limbs.

2. The practice of a preganglionic section for the upper limb is advised and a technique is described.

3. Cervicothoracic ("stellate") ganglionectomy should no longer be done for vascular disturbances of the upper limb.

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THE PREVENTION OF SPONTANEOUS MAMMARY CANCER IN MICE

BY THE THYROTROPIC HORMONE OF THE PITUITARY GLAND

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The observation recorded by us two years ago,[2 3 4] and since confirmed by several observers,[1 9 11 12 16] that the development of mammary cancer in the mouse by the continued application of œstrin is accompanied by a profound disturbance of the whole endocrine apparatus, particularly of the pituitary gland and of the adrenal glands, led us to consider the possibility that these endocrine changes may be ætiologically related to the process of carcinogenesis in the mamma.

The adrenal and the pituitary glands are affected by œstrin in two opposite directions. In the adrenals the change is a frankly degenerative one, while a detailed histological study of the pituitary body at different stages of œstrinisation led us to the conclusion that the changes in the anterior lobe are an expression of an initial stimulation of this part of the gland. In order to redress the hormonal balance disturbed by the presence of excessive amounts of œstrin administered to the organism, the chromophil cells, and particularly the acidophil cells of the anterior lobe of the pituitary, secrete their specific hormones. This stimulation to increased functional activity of the anterior lobe produces a hyperæmia and a hyperplasia of this lobe, together with a progressive degranulation of the acidophil cells, which enlarge and assume the appearance of chromophobe cells. If the œstrinisation is continued sufficiently long this process leads eventually to an exhaustion of the anterior lobe, which is then greatly enlarged, deeply congested, and composed almost entirely of chromophobe cells.

It is thus possible to account for the apparent paradox that one can produce experimentally a great increase in the mass of the gland in association with symptoms similar to those found after its destruction or operative removal.

HISTOLOGICAL CHANGES

If this conception is correct, it means that one or more hormones of the anterior lobe of the pituitary gland are capable of antagonising the effect of œstrin

PHOTOMICROGRAPHS OF SECTIONS CUT THROUGH THE PARS ANTERIOR OF THE PITUITARY GLAND OF EXPERIMENTALLY TREATED MICE. ALL SECTIONS WERE DIFFERENTIALLY STAINED, BY A MODIFICATION OF MALLORY, TO SHOW THE ACIDOPHIL, BASOPHIL, AND CHROMOPHOBE CELLS. (A, Low power; B, High power)

FIG. 1. ŒSTRIN ALONE

FIG. 2. ŒSTRIN AND THYROTROPIC HORMONE

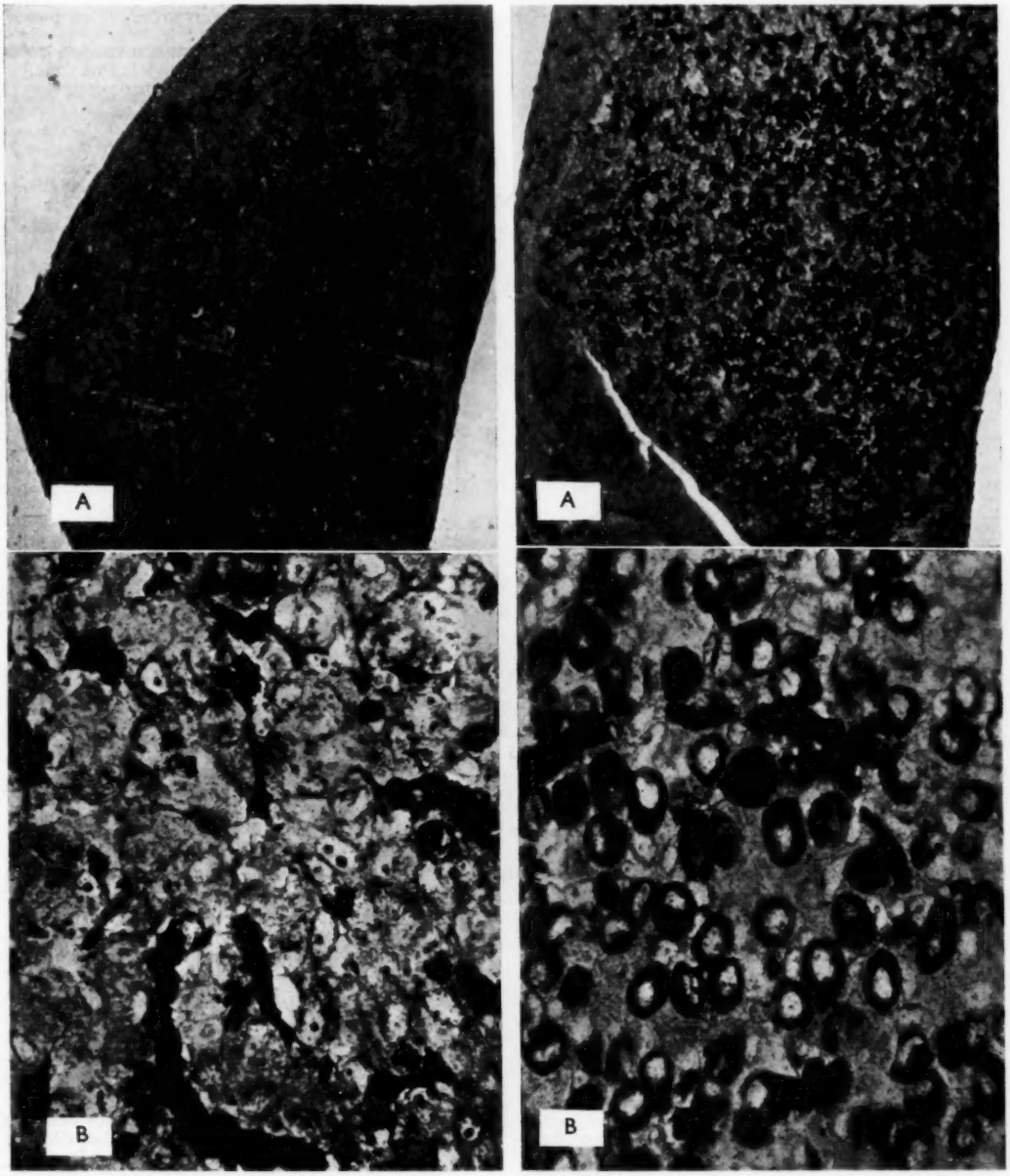

FIG. 1.—From a male mouse (No. 958) after seven months' œstrin treatment. Note the absence of acidophils and the presence of intense congestion.

FIG. 2.—From a male mouse (No. 956) after seven months' treatment with œstrin and thyrotropic hormone. Compared with control in Fig. 1, there are a large number of deeply staining acidophils and no congestion.

on the pituitary gland, and possibly also its carcinogenic action on the mamma. Experiments with mice of mixed strains showed that the changes produced in the anterior lobe of the pituitary gland by the prolonged application of œstrogenic hormones could be prevented by the simultaneous administration of preparations containing the thyrotropic hormone of the anterior lobe.

Fig. 1 gives low-power and high-power views of the anterior lobe of the pituitary from a male mouse by œstrin. Fig. 4 represents the mamma of another male mouse treated with œstrin for the same length of time, but receiving also injections of the thyrotropic hormone.

PHOTOMICROGRAPHS OF SECTIONS OF THE MAMMARY GLANDS OF EXPERIMENTALLY TREATED MICE. (Low power)

FIG. 3. ŒSTRIN ALONE

FIG. 4. ŒSTRIN AND THYROTROPIC HORMONE

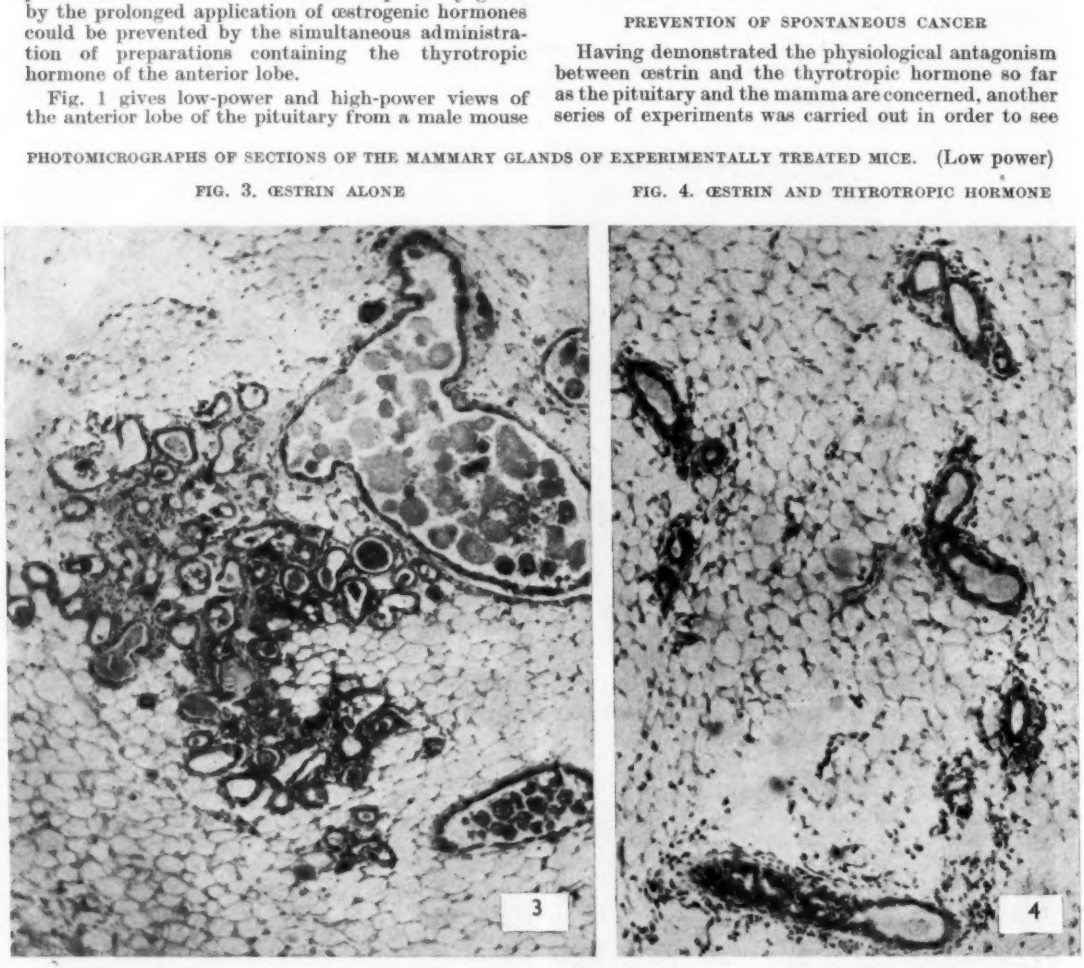

FIG. 3.—Mamma of same male mouse as in Fig. 1 (œstrin alone for seven months). Note the active proliferation, and secretory activity.

FIG. 4.—Mamma from same male mouse as Fig. 2 (œstrin and thyrotropic hormone for seven months). Note the inhibition of development, and compare with Fig. 3.

PREVENTION OF SPONTANEOUS CANCER

Having demonstrated the physiological antagonism between œstrin and the thyrotropic hormone so far as the pituitary and the mamma are concerned, another series of experiments was carried out in order to see whether the continued administration of the thyrotropic hormone would prevent the spontaneous development of mammary cancer in a highly inbred strain of mice, with a high incidence of spontaneous mammary cancer in the females.

The strain used for these experiments is the R.III strain, bred originally by Madame Dobrovolskaia-Zawadskaia [5] of the Institut du Radium in Paris and maintained in these laboratories since 1934 by brother and sister mating. Both the males and the females of this strain are much more susceptible to œstrin than the mice of our mixed laboratory stock. This increased susceptibility to œstrin manifests itself, not only by the earlier and more frequent appearance of mammary carcinomata in the mice of the R.III strain subjected to œstrinisation, but also by the greater extent of the changes produced

of the mixed laboratory stock after œstrinisation for seven months. The sections show the typical œstrin effect—an intense congestion and an almost complete disappearance of the acidophil cells. This figure serves as a comparison with Fig. 2, representing the anterior lobe of a pituitary gland of a male mouse from the same stock, subjected for the same length of time to a combined treatment with œstrin and the thyrotropic hormone (Schering). This presents an almost normal appearance; there is no congestion and there are numerous acidophil cells, although compared with the gland of a normal mouse there is a distinct diminution in their number. The proliferation induced in the mamma by the continued application of œstrogenic hormones can also be kept in check by the simultaneous administration of the thyrotropic hormone as shown in Figs. 3 and 4. Fig. 3 demonstrates the proliferation induced in the mamma of a male mouse of the laboratory stock

in the pituitary gland and the adrenal glands in the mice of this strain. For the adrenals, this is readily explained by the fact that the "brown degeneration" induced by œstrin in mice of the laboratory stock sets in spontaneously in the mice of the R.III strain, so that in these animals œstrinisation intensifies an already existing process.[4] The most striking manifestation of this increased susceptibility is that in some individuals of this strain the first application to the skin of a 0·01 per cent. solution of œstrin in chloroform produces sudden death. This remarkable phenomenon, which resembles in its appearance an anaphylactic shock, has been observed about 20 times in young mice of this strain that have a kinked tail and do not grow well.

The R.III strain has a mammary cancer incidence of about 60 per cent. in the breeding females reaching an age of 12 months or more. Two families of this strain were available—the Y family and the Z family—which show a slight difference in the age-incidence of mammary cancer, as shown in Table I:—

TABLE I—AGE-INCIDENCE OF SPONTANEOUS MAMMARY CANCER IN R.III FEMALES

Age (months).	Number of mice with mammary cancer.			
	Family Y.		Family Z.	
	Breeding.	Non-breeding.	Breeding.	Non-breeding.
4 ..	2	..	..	..
5 ..	2	1	..	..
6 ..	2	1	1	..
7 ..	4	1	2	1
8 ..	3	2	3	..
9 ..	1	2	3	1
10 ..	1	..	4	..
11 ..	..	..	1	..
12 ..	1	..	1	..
13 ..	..	..	1	1
14 ..	..	..	1	1
15 ..	..	..	1	..
Total number of mice ..	16	7	18	4

In the Y family the earliest mammary cancer observed so far has appeared after four months, while in the Z family the earliest mammary cancer has developed after six months. The cancer incidence then increases rapidly in both families, so that of all the females developing mammary cancer one half shows the process of carcinogenesis completed after seven months in Y family, and after nine months in the Z family. The cancer incidence in those females that proved to be sterile, though kept with males, is represented separately in Table I under the heading "non-breeding." This is necessary because the female mice treated with thyrotropic hormone, although kept with males, did not litter.

For a strict comparison, the results in the mice treated with thyrotropic hormone should be compared with the incidence of mammary cancer in untreated females, which, though kept with males, had not littered. There are on record 22 such animals, of which 11 (50 per cent.) developed cancer of the mamma. As can be seen from Table I, in which the age-incidence of the tumours in the non-breeding mice is recorded separately, cancer develops at very much the same ages in these mice as in the mice that produced litters. Only the total incidence is slightly diminished. A decrease of a similar order of magnitude in non-breeding mice has also been found in some other strains (Lathrop and Loeb[10]), but does not occur in all strains. In the dilute brown Murray-Little strain in which Murray[13] had at first described the great diminution in the cancer incidence among virgin as compared with breeding females, he subsequently failed with Little[14] to observe any great difference, and Korteweg's[7] observations on the same strain also showed a similar cancer incidence in virgin and in breeding females. In another strain bred by Kreyberg[8] the same cancer incidence was found in breeding and in sterile females. On the other hand, a marked diminution of the cancer incidence in non-breeding females has been observed recently in several strains by Loeb and his collaborators.[15]

Two different preparations of the thyrotropic hormone were used.

The first, the thyrotropic hormone isolated by Junkmann and Schoeller[6] is a yellow powder that has been biologically assayed, 1 mg. containing 10 guinea-pig units. A dose of 2·5 guinea-pig units of this preparation were injected five times weekly into the subcutaneous tissues. This preparation is stated to be free from the gonadotropic hormone, but it contains also the corticotropic (adrenalotropic) hormone. We are greatly indebted to Prof. W. Schoeller of Schering for placing this valuable material at our disposal free of charge. The other preparation used is Ambinon (Organon), which is stated to contain the thyrotropic and gonadotropic hormones. It is a watery fluid that has been biologically assayed and 1 c.cm. contains 150 guinea-pig units of thyrotropic hormone and 50 units of gonadotropic hormone. It was injected twice weekly in doses of 0·1 c.cm. (15 units of thyrotropic hormone).

The total dosage per week of these two preparations is therefore 12·5 units of the Schering preparation and 30 units of the Organon preparation. Altogether 25 females of the R.III strain, belonging mainly to the Y family, were submitted to the treatment which began at the age of 2 months—19 with the Organon and 6 with the Schering preparation.

The treatment with thyrotropic hormone was started just before the mice had reached sexual maturity, as in this strain cancer may develop as early as the

TABLE II—EFFECT OF PITUITARY HORMONE ON THE DEVELOPMENT OF MAMMARY CANCER IN R.III FEMALES

Family Y = 21 Females. Family Z = 4 Females

Nature of hormone preparations.	Age in months—		Number of mice.	
	At beginning of experiment.	At time of recording, Dec. 1st, 1937.	Mammary cancer— With.	Mammary cancer— Without.
Gonadotropic and thyrotropic.	2	12	0	8
	2	13	0	3
	2	14	0	3*
	2	16	0	3
	3	16½	0	2
Thyrotropic and corticotropic.	1	10	0	1
	2	11	0	1*
	2	11	0	4
Total number of mice ..	..	..	0	25

* The mice marked with an asterisk belong to the Z family.

fourth or fifth month, and immediately after the birth of the first litter. Although the females were kept with males, none of the treated females littered. The results are summarised in Table II. None of the mice treated with the thyrotropic hormone developed a carcinoma of the mamma, although the mice had reached an age, varying from 10–16½ months, at which in about 50 per cent. of the mice, if untreated, tumours would have appeared. The thyrotropic hormone had therefore inhibited the process of spontaneous carcinogenesis in the mammary gland. Most of the mice are still alive.

DISCUSSION

Lacassagne has already pointed out that the high incidence of spontaneous mammary cancer in the R.III strain cannot be due to an excessive secretion of œstrogenic hormones. Our results suggest that a disturbance in the endocrine balance between the ovary and the anterior lobe of the pituitary is an ætiological factor in the development of cancer in the mamma. This would account not only for the high incidence of mammary cancer in this strain, but also for the increased susceptibility to the general systemic effects of œstrin in the animals of this strain. If a complex endocrine defect of this kind is a factor in the development of cancer of the mamma it should be possible to identify in women a type characterised by this defect and by a high incidence of mammary cancer, and by correcting this defect by the administration of thyrotropic hormone to prevent cancer of the mamma. This is a subject for clinical investigation. We are now engaged in investigating the ætiological relationship between the adrenal changes, described by us in previous papers, and mammary cancer.

The physiological antagonism between the œstrogenic and the thyrotropic hormone has a bearing on therapeutic applications. Thus, the thyrotropic hormone may be useful in the treatment of conditions supposed to be due to an unbalanced action of the œstrogenic hormones such as the precancerous condition of the breast known as cystic disease of the breast (maladie de Reclus, Schimmelbusch's disease), and benign enlargements of the prostate.

SUMMARY

1. The spontaneous development of cancer of the mamma in female mice of a special strain having a high incidence of mammary cancer can be prevented by the thyrotropic hormone of the anterior pituitary gland.

2. The changes in the anterior lobe of the pituitary gland, as well as the development of the mammary gland in males, produced by prolonged œstrinisation can be kept in check by the simultaneous administration of the thyrotropic hormone.

3. The thyrotropic hormone is therefore in some respects a physiological antagonist to the œstrogenic hormone.

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SURGICAL TREATMENT OF ANGINA PECTORIS

AND ALLIED CONDITIONS

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(*Concluded from p. 10*)

GROUP II—OTHER SYMPTOMS OF CARDIAC ISCHÆMIA

WE do not dispute that angina of effort is caused by a defective blood-supply to the heart—indeed we would submit that the results in Cases 1, 4, 5, 8, 9, 10, and 15, when revascularisation relieved pain, contribute new and important evidence of this fact—but we also know that the most extreme degree of cardiac ischæmia may exist without causing pain at all: an infarct may form and even progress to rupture before pain is experienced. Again, although coronary thrombosis is a common complication of angina pectoris, if a large group of patients with coronary thrombosis be interrogated it will be found that often the warning symptom has been not pain but shortness of breath on exertion or a feeling of oppression in the chest. It is certainly an advantage when assessing the value of the operation to have as a measure of any therapeutic success a clear presenting symptom like angina of effort rather than vague symptoms of cardiac dysfunction, and we have therefore concentrated on the treatment of the angina group; but, bearing in mind that even in the absence of pain cardiac ischæmia may be fatal and with the more remote consideration that ischæmia is now believed to play a part—and possibly the dominant part—in that large group of cases formerly labelled "chronic myocarditis" or "myocardial degeneration," we have not felt justified in denying patients, purely as a matter of policy, the possible benefit of operation when we have felt that their symptoms were due to a defective blood-supply. Five in this group have been thus treated (Table II). In Case 3 recovery from a sudden attack of congestive heart failure had

TABLE II—RESULTS OF OPERATION IN PATIENTS WITH SYMPTOMS OTHER THAN ANGINA

Case.	Age and sex.	Diagnosis.	Operation.	Date.	Result.
3	44 F.	Hypertensive failure.	Cardio-omentopexy by suture	Oct. 2, 1936.	Symptom-free.
6	48 M.	Cong. heart. Stokes-Adams syndrome.	with insertion of aleuronat.	Feb. 5, 1937.	Died 9½ months later.
12	53 F.	Bundle-branch block.	Transpleural pericardiotomy for insertion of aleuronat.	April 30, 1937.	Improved.
16	56 F.	Auricular fibrillation		June 25, 1937.	Discharged from hosp., in statu quo.
20	64 M.	"	Cardio-pneumonopexy with aleuronat only.	Aug. 27, 1937.	Discharged from hosp., in statu quo.

been slow and incomplete; the patient was unable to lie down and the presence of pulsus alternans and a gallop rhythm indicated an extreme degree of myocardial change. The electrocardiogram showed inversion of the T waves in all leads, she had a negative Wassermann reaction and no valvular disease. In Case 6 we knew that despite a congenital defect of the heart the man had led a more or less normal life until two years before he consulted us as a bedridden cardiac patient. Then new symptoms appeared, the most important being repeated Stokes-Adams attacks. There was marked arterio-sclerosis, and it was decided that the *new* factor which had developed was cardiac ischæmia. In Case 12 we had a history of repeated attacks of severe cardiac failure, and here the presence of a bundle-branch block made it fairly clear that there was a defective coronary tree. In Case 16 the history pointed to the sudden onset of auricular fibrillation, which in view of the patient's age was almost certainly ischæmic in origin. Case 20 was similar.

CASE 3

A paper-seller, aged 44, was admitted to Lambeth Hospital on March 5th, 1936, with the story that she had collapsed in the street five weeks before with pain under the heart. She took to her bed for three days. She had been breathless on exertion for a fortnight before the attack, and since it had noticed increasing cough and breathlessness and a "stitch in the heart on hurrying." She had had no previous illnesses. Her father died of angina pectoris. Her mother suffers from hypertension.

Physical *examination* showed a short well-nourished woman in considerable distress, cyanosed and dyspnœic. Her mouth was grossly septic. The heart was enlarged. There was tachycardia and a well-marked gallop rhythm. The blood pressure was 200 mm. systolic and 140 diastolic. Râles were present at both bases. The liver was palpable but there was no ascites and no œdema. The urine was loaded with albumin and the blood-urea was 52 mg. per 100 c.cm. The Wassermann reaction was negative. The electrocardiogram showed inversion of T waves in all leads. A diagnosis of left-sided heart failure in hypertension, possibly due to coronary thrombosis, was made.

In spite of rest in bed progressive heart failure ensued, and on July 10th, four months after admission, examination showed the heart grossly enlarged clinically and radiographically (Fig. 7) and the gallop rhythm unchanged. The blood pressure had fallen to 170 mm. systolic and 130 diastolic. The venous pressure was 270–280 mm. of saline in the antecubital vein. There were râles at both bases and a small pleural effusion on the left side. The liver was much enlarged. There were ascites and gross œdema of the legs and lumbar region. The electrocardiogram showed inversion of T waves as before.

From this date she gradually improved. The abdomen was tapped twice, and caffeine, digitalis, and Salyrgan were administered. In September all her teeth were extracted. On Oct. 1st, seven months after admission, she was able to get up for two hours daily, and was free of symptoms except for slight dyspnœa on exertion and an inability to sleep lying down. The gums had healed well. The heart was not enlarged clinically and X ray examination showed remarkable decrease in its transverse diameter (Fig. 8). Gallop rhythm, however, persisted and there was a definite pulsus alternans, confirmed by the sphygmomanometer which showed a blood pressure of 210–190 mm. systolic and 120 diastolic. The venous pressure had fallen to 160–165 mm. of saline. Râles were no longer audible at the bases but pleural friction was present on the left side. The liver edge was just palpable. There was no ascites or œdema. The electrocardiogram showed increase of voltage and less marked inversion of the T waves.

Cardio-omentopexy was performed on Oct. 2nd, aleuronat being inserted into the pericardial sac and applied to the graft before its suture to the heart. At the end of the operation the pulse-rate varied from 100 to 120, the blood pressure was 104 mm. systolic and 80 diastolic, and the electrocardiogram showed no change. Recovery was uneventful. Four weeks after operation the heart sounds had improved in tone, there was no gallop rhythm or pulsus alternans, and the blood pressure had risen to 150 mm. systolic and 90 diastolic. The electrocardiogram showed progressive left axis-deviation. She was transferred to St. Benedict's Hospital for convalescence on Jan. 27th, 1937, was gradually activated there and discharged home on April 6th, free of symptoms.

She has since led a full and active life without medication. X ray examination shows normal movement of the left diaphragm and further diminution in the size of the heart shadow (Fig. 9). Her blood pressure is 210 mm. systolic and 130 diastolic.

7 8 9

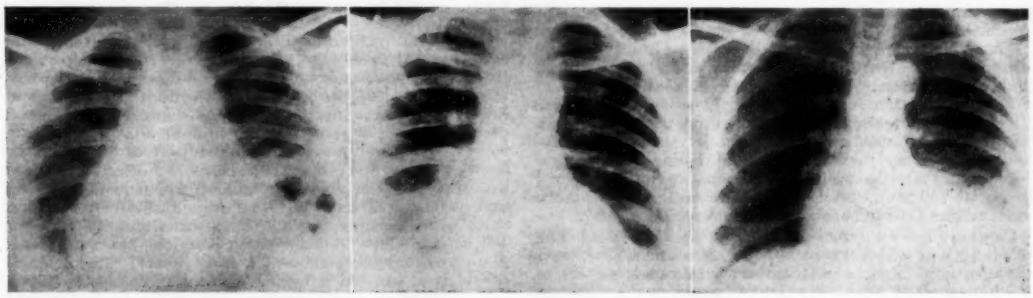

FIG. 7.—Radiogram in Case 3, showing the degree of cardiac enlargement four months after admission.

FIG. 8.—Same heart the day before operation.
FIG. 9.—Same heart thirteen months after cardio-omentopexy.

CASE 6

A coachbuilder, aged 48, entered Lambeth Hospital at the request of Dr. A. M. Gammie of Hounslow on Jan. 19th, 1937, for investigation as a case of Stokes-Adams syndrome. The first attack occurred in June, 1933, after two years of increasing lassitude. He was treated more or less in bed for nine months, during which attacks were frequent. He then remained free of attacks until Oct. 10th, 1936, when they returned. From that date he had been in bed on and off, and continuously so for the last month. His present condition varied: one day he dared not move, on the day of admission he sat up for breakfast and had only three or four slight attacks in spite of a long ambulance journey. Consciousness was lost during three attacks only, the first and two recently. He usually remained conscious and had a sensation of floating towards the ceiling. He had been treated with Calcio-coramine three times, and ephedrine gr. ½ twice, a day, and his wife kept a syringe of adrenaline in the bedroom.

He had had no previous illnesses. He was said to have had rheumatic fever at the age of 3, and was placed in category B3 in the war because of his heart. His father died of a stroke aged 74, and his mother reached the

age of 84. A brother died of auricular fibrillation aged 60, a sister died of rheumatic heart disease aged 17, and another sister was suffering from tachycardia.

On *examination* he appeared a lean but well-nourished man, lying flat in bed without distress. His tongue was moist and clean but his remaining lower teeth were septic. There was well-marked radial and brachial arterio-sclerosis. The apex-beat was in the 4th intercostal space, 4 in. from the midline. The cardiac impulse was visible, forcible, sustained, and definitely biphasic. The mitral first sound was much accentuated and booming, the aortic second sound accentuated. There was a third sound at the apex. The rate was constant at 40 per minute. There was a systolic murmur, heard well in the pulmonary area and conducted into the vessels of the neck. There was also a very short but definite aortic diastolic whiff. The blood pressure was 190 mm. systolic and 60 diastolic. Nothing abnormal was found in the lungs, abdomen, and central nervous system. The urine was normal and the Wassermann reaction negative. The blood-urea was 40 mg., the calcium 9·0 mg., and the phosphorus 1·8 mg. per 100 c.cm. X ray examination showed a large globular heart. The electrocardiogram showed 2 : 1 heart-block at a ventricular rate of 39, with inverted T waves in lead I and diphasic T waves in leads II and III. There was slight right axis-deviation, the S waves were notched in all leads, and the S–T interval was slightly depressed in leads II and III. Atropine had no effect either on the rate or the block. A diagnosis was made of cardiac ischæmia, superimposed upon a congenital interventricular septal defect insufficient in itself to produce heart-block. It was suggested that the presence of a congenital heart lesion might explain the diagnosis of rheumatism in infancy and also why he was classified B3 at a time when he felt himself to be an A1 man. (He could push a heavy roller and play strenuous tennis without breathlessness or distress.) His remaining teeth were extracted on Jan. 26th. On Feb. 1st there was a brief return to normal rhythm, confirmed by electrocardiogram, and during it the mitral third sound disappeared. The blood pressure remained steady at 190 mm. systolic and 90 diastolic. The venous pressure was 145 mm. of saline in the antecubital vein.

Cardio-omentopexy was carried out on Feb. 5th. The left lung was adherent to the pericardium. The heart was enormous but the pericardium was not tense—facts which suggested that they had "grown up" together, for in cardiac hypertrophy due to acquired lesions the pericardium is found tense during life. The inferior pericardial ligament was not observed. The omental graft, which was obtained with some difficulty and contained very little fat, was vascular but smaller than in any previous case. It was sutured and aleuronat inserted freely. There were no pericardial adhesions and some excess of fluid. The pericardium was not completely closed. An electrocardiogram taken one hour afterwards showed that the pre-existing sinus rhythm was being interrupted and largely replaced by an independent ventricular rhythm (rate —32 per min.), arising from an ectopic focus in the left ventricle, possibly the point at which the graft was sutured. The blood pressure at this stage varied between 130 mm. and 115 systolic and 70 and 60 diastolic. Three hours later it was steady at 122 mm. and 64. Recovery was uneventful. Pericardial friction was audible on the third day. Administration of ephedrine and calcio-coramine was continued for a fortnight. The blood pressure slowly rose to remain constant at 160 mm. systolic and 70 diastolic. He was allowed up at the end of four weeks and was discharged home on March 22nd.

The electrocardiogram during the first week after operation showed varying 2 : 1 and 3 : 1 heart-block and a raised S–T interval in leads I and II. At the end of four weeks the T waves had become inverted in all four leads. During the second month the ectopic ventricular beats began to reappear, while the T waves of normal ventricular complexes slowly recovered and became positive. By the end of three months, however, the ectopic focus had established a regular ventricular rhythm with complete heart-block, which persisted. He had no Stokes-Adams attacks after the operation. He felt quite fit in himself and was leading a normal life, though there was some shortness of breath during strenuous exertion such as gardening. X ray examination on Sept. 24th showed that the left diaphragm was still at a higher level than the right but had recovered some normal movement of its inner end.

Early in November, 1937, he caught a chill. He was readmitted to Lambeth Hospital on Nov. 17th, and died four days later of congestive heart failure. Post-mortem examination revealed a moderate coarctation of the aorta just proximal to the ductus arteriosus, which was patent. There was no septal defect. Histological examination of the heart with its attached graft is in progress. It is suggested that the improvement, which followed operation, may have been due to the fixation of an ectopic ventricular rhythm rather than to revascularisation via the graft.

CASE 12

A housewife, aged 52, was transferred to Lambeth Hospital on March 30th, 1937, with a history of sudden attacks of left-sided heart failure, which had necessitated her admission to hospital six times during the past three years. The attacks were painless. She had been in hospital since the beginning of her last attack in autumn, 1936. She had acute rheumatism at the age of 21, for which she was in bed for over three months. She had had eleven children. Her father died of "myocarditis, asthma, and pneumonia," and her mother of a stroke.

Examination showed a cheerful, well-nourished, high-complexioned woman, propped up in bed but not distressed. The tongue was moist and clean. There was marked pyorrhœa. The apex-beat was in the 5th intercostal space, 3½ in. from the midline, and the cardiac impulse was heaving. The mitral first sound was low-pitched and accentuated, and the aortic second sound somewhat ringing. The sounds were spaced and gallop rhythm was present. A soft systolic murmur was audible at apex and base. There was no radial arterio-sclerosis. The blood pressure was 172 mm. systolic and 98 diastolic. There were obvious veins over the upper part of the chest in front and a few fine râles at both bases. Nothing abnormal was found in the abdomen and central nervous system, and there was no œdema. The urine and kidney function tests were normal and the blood-urea was 40 mg. per 100 c.cm. The Wassermann reaction was negative. X ray examination showed a large heart. The electrocardiogram showed a typical right bundle-branch block (old terminology). Her remaining teeth were extracted under Evipan anæsthesia on April 13th.

Left *thoracotomy* was performed on April 30th. The heart was found to be much enlarged and the pericardium unusually thin. The phrenic nerve was not crushed. The pericardium was opened, aleuronat inserted, and the pericardium closed with one suture. The pulse-rate at the end of operation was 96 and the blood pressure 132 mm. systolic and 92 diastolic. Recovery was uneventful. There was moderate pyrexia for a week and a leucocytosis reaching 16,400 per c.mm. No pericardial friction was heard. She was allowed up at the end of four weeks, gallop rhythm being still present. She was transferred back to Hounslow Hospital on May 15th, 6½ weeks after operation. There was then no definite gallop rhythm and the electrocardiogram showed left axis-deviation, inversion of T waves in leads I and II, and a disappearance of bundle-branch block.

She was seen again on August 20th. The heart sounds were of fair quality, with less spacing than formerly and no gallop rhythm. The sphygmomanometer revealed systolic alternation between 180 mm. and 160. The electrocardiogram showed a return to bundle-branch block. On Oct. 12th she was still in hospital and up and about the ward most of the day without breathlessness. The blood pressure was 160 mm. systolic and 100 diastolic, without alternation. There was no gallop rhythm. Bundle-branch block had persisted. She has now been discharged home.

CASE 16

A housewife, aged 56, was admitted to Lambeth Hospital on May 15th, 1937, with the story that she had been seized with a sudden attack of breathlessness and throbbing pain beneath the breast-bone while on holiday in August, 1936. The pain had lasted a couple of days and forced her to take to her bed. She had had several similar

attacks since. She was an in-patient in Lambeth Hospital during March and April, 1937, when she was found to be suffering from auricular fibrillation of sclerotic type. Since her discharge she had complained of increasing breathlessness and a sense of suffocation. Her father died of rheumatic fever when she was an infant and her mother of a stroke. Her previous health had been good and she had never had rheumatic or scarlet fever. She has three children.

On *examination* she was found to be dyspnœic and cyanosed. Her heart was enlarged and fibrillating rapidly. There were a few râles at the right base. Her liver was enlarged and tender but there was no œdema. She improved rapidly on digitalis and began to get up on June 8th. She was referred to the Cardiovascular Clinic on June 13th. There was no radial arterio-sclerosis. Her blood pressure was 160–175 mm. systolic and 100 diastolic. The urine was normal. The blood-urea was 23 mg. per 100 c.cm. and the urea-concentration test showed 1·4 per cent., 1·8 per cent., and 2·0 per cent. of urea. The Wassermann reaction was negative. The basal metabolic rate was +12 per cent. X ray examination showed a large triangular heart. The electrocardiogram showed auricular fibrillation of sclerotic type. In view of her incapacity and liability to breakdown it was decided to operate on the assumption that her fibrillation was due to cardiac ischæmia. Just before operation examination showed some tachycardia, râles at both bases, and a blood pressure of 110–120 mm. systolic and 80 diastolic.

Thoracotomy was performed on June 25th. The phrenic nerve was not crushed. The pericardium was somewhat tense and the heart's action rapid and feeble. The pericardium was opened and a small quantity of aleuronat inserted. There were no pericardial adhesions, slight bleeding from a vessel on the heart surface was checked with a small piece of pectoral muscle. The blood pressure at the end of operation was 80 mm. systolic and 50 diastolic. There was a tachycardia reaching 184 per min. on the second day but the condition responded well to digitalis. Leucocytosis occurred and reached a maximum of 24,400 per c.mm. on the seventh day. An electrocardiogram taken immediately after operation showed no change, but no further records were taken during the next fortnight. She had a return of palpitations and tachycardia at the beginning of August, but again responded well to digitalis. She was discharged home on Sept. 17th. A week later she was taking life easily at home, staying in bed half the day. She was not breathless on exertion but complained of a rapid thumping over the heart. The heart was fibrillating slowly when examined and its sounds were of good quality. There were a few râles at the left base. The blood pressure was 170 mm. systolic and 90 diastolic. She was still taking digit. fol. gr. 1 twice a day.

When last seen on Oct. 22nd she was complaining of breathlessness again during the past three weeks, and her doctor had put her back on digitalis. There was no œdema.

CASE 20

A printer's warehouseman, aged 64, was transferred to Lambeth Hospital on August 11th, 1937, from St. Olave's Hospital (L.C.C.) with the story that he had slowly become breathless on exertion two years before. He was told by his doctor it was heart trouble and was treated successfully with medicine. Six months before admission the symptom had returned, accompanied as before by swelling of the ankles. He could not walk now without being pulled up almost at once by a choking sensation across the upper part of the chest. There was no pain. He was a pipe-smoker and used to drinking ale and stout. He had never had rheumatic or scarlet fever. Twenty years ago he had begun to be troubled with a gastric ulcer, symptoms of which persisted until they were completely relieved by a gastro-enterostomy in 1924. There was no history of angina, heart trouble, or strokes in the family. He has a son and four daughters, all grown up.

Physical *examination* showed a well-nourished man of lean type. The right cornea was opaque, owing to an accident in infancy. The mouth was grossly septic. The apex-beat was in the 6th intercostal space, 4½ in. from the midline. The heart sounds were accentuated but rather thin. Fibrillation was present and there was a systolic murmur at the apex. The blood pressure was 164 mm. systolic and 84 diastolic. There was marked radial and brachial arterio-sclerosis, and some overfilling of the anterior thoracic veins. A few râles were heard at the bases. The circumference of the chest measured 32½ in. in expiration and 34 in inspiration. The abdomen was rotund. There was a well-healed midline scar. The liver was not palpable. Nothing abnormal was found in the central nervous system. There was slight œdema of the ankles. The left leg showed varicose veins and the pigmented scars of two ulcers. The urine and kidney function tests were normal. The blood-urea was 36 mg. per 100 c.cm. The blood was normal and the Wassermann reaction negative. X ray examination showed an enormous heart. The electrocardiogram showed auricular fibrillation and inversion of the T waves in all leads. There was no axis-deviation. The œdema disappeared after a few days in bed. All his teeth were extracted on August 24th.

Thoracotomy was performed on August 27th and the phrenic nerve crushed. The heart was so enormous that the diaphragm could not be exposed enough for omentopexy to be carried out. The pericardium was opened and the coronary artery could be seen exposed and thickened but not tortuous. Aleuronat was inserted and the left lung sutured to the anterior edge of the cut pericardium. The pulse-rate at the end of operation was 88. He developed bronchitis with mild pyrexia which lasted a week. There was a leucocytosis of 34,800 per c.mm. Signs of collapse were present at the left base During the third week he developed considerable œdema of the legs, which responded well to Digoxin. The blood pressure rose gradually to its pre-operative level. He was allowed up, but by Oct. 8th œdema had returned, involving the legs and lumbar region. There was no tachycardia and he was well digitalised so injections of salyrgan were given every other day with good effect. He has been discharged home, is free of œdema, and able to get up daily without symptoms.

To sum up, in these five cases of non-anginal cardiac ischæmia submitted to operation we record one death. All five were chronic invalids. One is now leading a life of normal activity, one is improved, and the remaining two have recently been discharged from hospital and are no longer confined to bed.

Discussion

It might be as well to preface any discussion of the surgical treatment of angina pectoris with a brief consideration of the anginal patient's lot and what purely medical measures can do to alleviate it.

From Heberden's day "angina pectoris" has been the name given to a symptom-complex the peculiar feature of which is the possibility of sudden death; modern research has shown that its cause is defective coronary circulation. From the first attack the victim's activity is curtailed, to the particular disgust of the active type of person most prone to angina, and that curtailment is usually progressive. In severe cases fear of the next attack with its agonising pain weighs heavier than the "angor animi" which accompanies one. Prognosis is impossible. "The cardinal fact in real angina is its uncertainty" (Walshe, quoted by Osler 1925). Approximately half of the series published by Levine and Eppinger (1934) died suddenly. The disease marches inexorably, for the pathological condition underlying it is defective coronary circulation due to changes in the coronary tree which are irreversible and progressive. Clearly its progress cannot be arrested by physic, and this remark is most true of that catastrophe which awaits every victim of angina—coronary thrombosis. So far from being able to avert this often fatal complication, the physician may sometimes hasten it by his most valuable method of treatment, rest in bed. It must not be thought that nothing can be done to

alleviate the disease. Much can be achieved by skilful management, which would include avoidance of the factors which precipitate pain (such as emotional stress, undue exertion, heavy meals, or exposure to cold), reduction of the patient's weight, and the use of nitrites for individual paroxysms. But granted the value of such measures as these, it must be repeated that they can only alleviate angina, and avail not either to attack its underlying cause or to postpone the catastrophe of coronary thrombosis. Medicine, in short, can do much to lighten the lot but little to alter the prognosis of the patient with coronary disease.

Our initial attempts at the surgical treatment of cardiac ischæmia were not embarked on without some misgiving. It appeared as if an operation might be too severe for those in the last stages of angina pectoris to endure and too severe for those in the earlier stages to contemplate. Actually, bedridden patients have displayed no immediate distress after the full operation of cardio-omentopexy. Diaphragmatic hernia was naturally considered as a possible complication of cardio-omentopexy, but we have not seen it in man, it has not occurred in the greyhounds which were subjected to great physical strain after their operation, and we do not now believe it to be a serious danger.

SELECTION FOR OPERATION

In the selection of patients two criteria were considered essential: unequivocal evidence of cardiac ischæmia and fitness for operation.

1. *Evidence of cardiac ischæmia* was sought in the patient's history and in the clinical, electrocardiographical, and radiographic findings.

Angina of effort—that is, cardiac pain which bears a direct relationship to exertion—is pre-eminent among symptoms, which include also attacks of painless dyspnœa, retrosternal oppression, or pulmonary œdema. The patient's daily consumption of nitroglycerin tablets provides a useful indication of the amount of pain. Clinically, importance was attached to gallop rhythm, pulsus alternans, or progressive fall of blood pressure. Not represented in this series but of great significance would be specific aortitis associated with anginal pain. In the electrocardiogram findings of value are disturbances of conduction as evidenced by lengthening or gross notching of Q R S and by bundle-branch block, flattening or inversion of T, alteration in the S–T interval, and presence of a Q wave in lead III. Lead IV was taken in every case, the technique advocated by Willcox and Lovibond (1937) being used and the left-arm electrode being applied over the fourth intercostal space because the apex-beat is not available while the operation wound is healing. Radiographically, the size of the heart affords little help, whereas demonstration of a cardiac aneurysm or of calcification of the coronary arteries is conclusive. The fact of coronary thrombosis, although constituting proof of coronary artery disease, was not considered enough in itself to justify operation, in view of the possibility of natural repair and revascularisation by the formation of pericardial adhesions. But a history of previous infarction in patients complaining of angina or breathlessness on exertion was held to strengthen the case for operation. It is our policy, therefore, to keep cases of coronary thrombosis under the strictest observation and to advise surgical intervention only if symptoms of cardiac ischæmia recur.

2. In assessing *fitness for operation*, age is the first consideration. Although our series includes a man of 72, it was thought inadvisable in most cases to suggest operation for patients over 65. This figure is no hard and fast limit, for often a young 70 will prove a better operative risk than an old 60, but, generally speaking, we operated on older patients only when relief from intolerable suffering was urgently demanded. In cases where pulmonary complications were feared, operation via Larrey's angle was available, a procedure which involves neither the pleural cavity nor the diaphragm and which can if necessary be performed under local anæsthesia. We have been impressed by the number of patients with angina who have rigid chests with poor respiratory movement, and our assessment of the chest condition has included measurement of the vital capacity and chest expansion. Breathing exercises have been found valuable, whether operation is to follow or not. In addition to standard radiograms a pre-operative radiogram taken in bed has been deemed advisable for more strict comparison with those taken in the early days after operation. Kidney function has been investigated in every case, but hypertension in itself has not been considered a contra-indication to operation.

TABLE III—PATIENTS INVESTIGATED BUT NOT OPERATED

Sex and age.	Diagnosis.	Reason for non-intervention.	Result.
M. 58	Angina pectoris.	Chronic bronchitis, art. calcification.	Died suddenly in bed.
M. 48	"	Awaiting admission.	Died suddenly at wheel of car.
M. 54	"	Chronic bronchitis.	? In statu quo.
M. 53	"	Patient refused.	In statu quo.
M. 64	"	Nephro-sclerosis.	" "
M. 47	"	Chronic bronchitis.	" "
M. 39	"	Gangrene of foot.	" "
F. 60	"	Nephro-sclerosis.	Died in uræmia.
F. 65	"	Patient refused.	Died suddenly in bed.
F. 73	"	Age.	In statu quo.
F. 64	"	Diabetes.	" "
M. 77	Coronary thrombosis.	Acute stage.	Died.
M. 74	"	" "	"
M. 71	"	" "	"
M. 53	"	Symptom-free.	Under observation.
M. 65	"	" "	" "
M. 64	"	" "	" "
M. 55	"	Patient refused.	Breathless on exertion.
F. 71	"	Acute stage.	Died.
F. 64	"	Symptom-free.	Under observation.

Details of the cases which were investigated with a view to operation but in which operation was not carried out appear in Table III. It will be seen that 40 per cent. of the patients have died, a fact which shows only too clearly the appalling mortality from coronary disease; of the survivors those recovering from an attack of coronary thrombosis are potential subjects for operation.

THE OPERATION AND ITS SEQUELS

The operation itself brought out many points of interest. The omentum presented readily in every case, when the diaphragm was incised, often in spite of previous laparotomies. It was possible to study the pathology of the living heart and pericardium. The inferior sternopericardial ligament is a far more striking structure during life than when seen post

mortem, and this is true also of the tenseness of the pericardium over the hypertrophied heart, when it may be as difficult to pick up and incise as is the dura mater over an œdematous brain. An exception to this was seen in Case 6, where the heart was greatly hypertrophied owing to a congenital lesion, but the pericardium was not tense. It is suggested that in congenital cases, where heart and pericardium "grow up" together, pericardial tension will not be found. We learnt to distrust a heart in which the myocardium is grey-yellow in colour, or where the left descending coronary artery is tortuous and exposed (Case 7).

The post-operative course was fortunately smooth in most cases. Post-operative shock, which would be a serious complication in the angina group with its threat of initiating a coronary thrombosis, was not observed. In Case 10 there was a reactionary hæmorrhage which required no special treatment. Signs of collapse at the left base were found in every case in which the diaphragm was paralysed and mild purulent bronchitis was of frequent occurrence. The diaphragm takes 4–6 months to recover and movement returns before tone. Fever (Fig. 6) and a well-marked leucocytosis occurred, especially when aleuronat was used, and in the latter case pericardial friction was usually heard. The electrocardiographic changes will be discussed in detail in a later paper. No change was recorded immediately after operation, which suggests that paralysis of the left diaphragm may produce no immediate axis-deviation. Aleuronat pericarditis as might be expected was associated with elevation of the S–T interval (Fig. 5, arrow) especially marked in lead II. In three or four weeks inversion of the T waves in leads I and II commonly occurred (Fig. 5), a change we interpret as indicating a myocardial reaction comparable with that seen in the T_1 type of coronary thrombosis. Paroxysmal auricular fibrillation was recorded in Cases 4 and 5 (Fig. 5), and responded readily to quinidine.

Results and Commentary

There have been six deaths in this series of twenty cases—one immediate, the others after periods varying from seven weeks to nine months. Details of the post-mortem findings are given in each case-history. The evidence obtained in Case 18 suggests that there is a degree of cardiac ischæmia incapable of relief by surgical means. Case 7 was probably of this type, but the association of a normal aorta and renal vessels with advanced coronary disease might indicate that at a rather earlier date revascularisation could have been effective. In Case 14 there was no post-mortem examination, but it seems likely that the cause of death seven weeks after the operation, with a wound soundly healed, was related to the cardiac arrhythmia rather than the operation.

From consideration of our fourteen surviving patients it will be seen that all those who have survived operation for six months or longer are better, and most of them symptom-free. In Group I (Table I) Case 1 is free of pain, and has been restored at the age of 65 from a life of invalidism to one of full activity. Case 4, who was confined to bed and prevented by pain from washing herself, is now leading a normal life at the age of 66. Case 5 could not mount more than five steps without bringing on an attack; he now climbs sixty stairs to his room without pain. Cases 8, 11, and 13 have returned to work. Case 9 had been compelled to sell his car, and move from a house to a bungalow in order to avoid stairs; since his operation he has moved back into a house and is driving a car again. Case 10 has to climb seventy-two stairs daily to his office. Before his operation he was forced to stop frequently on the stairs as well as on each landing, and used to reach the top in considerable distress. He can now climb them without pain or discomfort, though he still stops on each landing as a precaution. The same patient consumed before his operation 48 tablets of trinitrini a week; now he has ceased taking this drug. Case 15 was still confined to bed owing to angina nearly a year after a coronary thrombosis; now at the age of 65 she is at a convalescent hospital, free of pain, and able to get up for two or three hours a day. In Group II (Table II) Case 3 lost her gallop rhythm and pulsus alternans, which had been present for five months, a month after operation and is now fully active. X ray examination shows a return of her heart shadow to normal size (Fig. 9). Case 6 had no further Stokes-Adams attacks after his operation, and, until his fatal illness, was no longer confined to bed but attending to his business. Case 12, since her operation, has had no further attacks of failure and her clinical condition is better.

As we would have assumed from the experimental evidence, improvement increases with time. The patients who were improved six months after their operation are still better six months later.

The present communication does not claim to prove that surgery offers an unfailing cure for angina but only to support the original contention (O'Shaughnessy 1937) that operation is feasible and attended with a low immediate mortality. We realise that for final justification the operation must be shown to have improved the prognosis in a large series of angina cases, and since it has been established by numerous studies on the prognosis of this disease (Levine and Eppinger 1934) that the expectation of life from the date of the first paroxysm is just under five years, we have clearly many years to wait for the acid test. Nevertheless, now that we have indisputable experimental and pathological evidence that revascularisation of the heart can be induced in man, we feel that application of the principle so established to a proportion of that enormous group of patients who are suffering from a deficient blood-supply to the heart is justified.

Summary

Initial experiences are reported with the treatment of coronary disease by cardio-omentopexy.

The types of cardiac ischæmia and the mechanisms of natural compensation are briefly described.

The experimental basis of cardio-omentopexy and allied operations is reviewed.

The cases, 20 in number,* are considered in two groups: 15 suffering from angina pectoris and 5 from other symptoms of cardiac ischæmia. Of the first group, 5 died, while 8 of the remaining 10 are free of angina. In the second group there was 1 death and 1 is free of symptoms.

Discussion is devoted to the limitations of medical treatment, the selection of patients for operation, and the points which have arisen from the operation itself and the post-operative course of the patients.

Details are given of a further 20 cases which were investigated with a view to operation but in which operation was not carried out. Of this group 8 have already died.

The results are analysed in detail. It is claimed that the experimental, pathological, and clinical evidence justifies the application of cardio-omentopexy

*This series does not include the first case of cardio-omentopexy performed at Lewisham Hospital (L.C.C.) on Jan. 4th, 1936, cases operated on in the Lambeth Cardiovascular Clinic since Sept. 1st, 1937, and cases operated on elsewhere.

to a proportion of patients suffering from defective coronary circulation.

We have many acknowledgments to make, one of us (L. O'S.) to the Medical Research Council from whom he receives a personal grant. We are grateful to Dr. Geoffrey Konstam, who referred some cases to us for operation and joined us in consultation on them. We wish to thank also the many practitioners who have been kind enough to send us patients, and the medical superintendents of Lewisham, St. Olave's, and St. Stephen's Hospitals (L.C.C.) for transferring cases to the Clinic. For personal coöperation we are indebted to Dr. J. K. Hasler, our consultant anæsthetist, to Mr. David Slome and Dr. Philip Berry for surgical assistance, to Dr. T. McK. Robb for technical help, to Dr. W. G. Barnard and Dr. R. F. L. Hewlett for all the pathological work, and finally to Dr. P. J. Watkin, medical superintendent of Lambeth Hospital, and Mr. G. F. Stebbing, its surgeon specialist, for their ready help and advice. In conclusion, we are deeply grateful to Sir Frederick Menzies, medical officer of health for the County of London, for his constant encouragement and for permission to publish these cases.

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TRANSFUSION OF BLOOD AND OTHER FLUIDS IN INFANCY

By George Ormiston, M.D., M.R.C.P. Edin.

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THE parenteral administration of various fluids has been increasingly in vogue since the importance of the replacement of body water and salts in conditions leading to dehydration, and the value of dextrose in certain states of intoxication, have been realised.

Dehydration and anhydræmia are particularly common in infancy as the result of infections leading to vomiting or diarrhœa or both. Such infections are: (1) upper respiratory, including otitis media and mastoiditis; (2) intestinal per se, including intestinal intoxication (cholera infantum) and dysentery; (3) renal tract (pyelitis, pyelonephritis); and (4) meningitis. Dehydration of some degree also takes place wherever there is failure to ingest food and fluid beyond a limited period, and in all conditions leading to gastric and intestinal obstruction (pyloric stenosis, intussusception).

Dehydration and anhydræmia are accompanied by disturbance of the acid-base balance of the body, resulting in acidosis and ketosis, or alkalosis, manifest or non-manifest clinically. In addition, where infections are unduly prolonged, there is a slow destruction of serum protein and erythrocytes.

The replacement of body fluids and salts is therefore strongly indicated and may be life-saving. The routes employed for this replacement in infancy are the subcutaneous, the intraperitoneal, and the intravenous. These routes may be used singly or in combination. The first two are adequate for the treatment of milder dehydration. Aside from the transfusion of blood or serum, the last is particularly valuable in anhydræmia where rapid restoration of the blood volume is needed. Further, dextrose may be given intravenously in concentrations that are highly irritating to the subcutaneous or intraperitoneal tissues.

Intravenous technique as applied to adults has been adequately described. A Wassermann-size needle is used, or the vein cut down on and a cannula inserted. The veins of the infant, however, are small, movable, less distinguishable, and mostly unsuited to the employment of the standard needle. Repeated transfusions may be necessary in long-continued infections, and the frequency with which the cutting operation may be done is limited. The sagittal sinus provides an easy and reasonably safe site for the introduction of fluids. Its disadvantages are that it cannot be used for continuous administration, and that, unless in exceptional circumstances, it ought not be to used for the transfusion of blood owing to the dire results of error, whereby blood is injected on to the surface of the brain.

THE TECHNIQUE RECOMMENDED

The following method is used with success in the Princess Louise Kensington Children's Hospital for the transfusion of blood in infants, and for the intermittent and continuous transfusion of fluids.

A 500 c.cm. Florence flask is fitted with a two-holed rubber stopper and appropriate glass tubing. To the shorter tube is attached about four feet of rubber tubing, the other end of which is joined to a three-way stopcock for the transfusion of a single quantity of fluid, otherwise to a metal adapter for insertion into the base of a hypodermic needle (Nos. 16–18), if continuous intravenous administration is required (Fig. 1).

FIG. 1.—Flask containing fluid to be transfused, showing position, with rubber tubing, box-screw clip and Murphy drip.

For transfusion purposes, a hypodermic needle and a 10 c.cm. all-glass syringe (with nozzle to fit a Record needle) are fixed to the three-way stopcock (Fig. 2). The Florence flask is filled, inverted, and placed on the right of the operator about three feet above the patient. The former should sit in a comfortable position facing the top of the infant's head.

The infant is wrapped securely in a sheet or blanket to prevent movement of the arms or legs, and laid supine across the cot. The nurse secures complete immobility by placing her elbows and forearms alongside the body of the infant, grasping the face and head firmly with both hands. The head should be turned flat on the side. The side uppermost is shaven clean over an area extending back as far as the posterior margin of the ear, and up as far as the junction of the top and side of the cranium. This area is then sterilised with iodine and alcohol.

The superficial temporal vein and its frontal and parietal tributaries are identified. These veins are

often hard to make out when the patient is anhydræmic, but they can be brought up by gentle slapping or stroking with a cotton-wool swab. It helps to make the vein stand up if the forefinger is placed on the zygomatic arch.

Ten c.cm. of the fluid in the flask is drawn into the syringe. The stopcock is adjusted for outflow through the needle, which is now threaded to its full length

FIG. 2. — Transfusion of citrated blood through hypodermic needle, using 10 c.cm. syringe and three-way stopcock.

FIG. 3. — Hypodermic needle in superficial temporal vein; rubber tubing with metal adapter attached.

into the vein (Fig. 3). No attempt should be made to draw blood back into the syringe, for the bore of the needle is too small to permit this. Instead, pressure should be applied to the barrel of the syringe, and if the vein has been entered, the inflow is free and easy, whereas failure results in a subcutaneous injection and the immediate appearance of a lump, at which the needle should be completely withdrawn and the attempt repeated, using the same vein at a more proximal point, or else another vein altogether.

For the continuous administration of fluid, the needle is first attached to a 2 c.cm. all-glass syringe filled with saline, and the vein entered as before. The injection of a small quantity of saline reveals the position of the needle, from which, if in the vein, the syringe is gently disengaged and replaced by the rubber tubing with adapter. The system should be filled and a drop flow permitted before the above manipulations, so that interruption of the flow through the needle should be as short as possible. The rate of flow is controlled by the use of a Murphy drip and a box-screw clip interposed between the flask and adapter.

Once the adapter is connected, it is held in position by a cotton-collodion mould. Small pads of cotton-wool are impregnated with collodion and pressed against the head of the needle and the adapter and the adjacent rubber tubing till dry. The needle is thereby kept in alignment, and the position further stabilised by strapping the collodion pads and tubing to the head with adhesive. The whole operation requires delicacy and care, but if it is successful the fluid will run for 24–48 hours without further attention except as regards regulation of flow. It is seldom that the flow will continue beyond this period. If further continuous administration is desirable, the collodion and adhesive should be softened with acetone and taken off, and the needle withdrawn. The other side of the head should now be used, or else the veins in other situations, such as the ankle veins.

It should be noted that a small area round the needle is apt to become œdematous within a few hours. The œdema is purely local; it is in the nature of a reaction to the presence of a foreign body and is without significance so long as the flow is unimpeded. Unless this is recognised, the inexperienced operator is likely to disconnect the apparatus under the impression that the needle is out of the vein and the fluid getting into the tissues.

CONCLUSIONS

The advantages of the above method are: (1) It is safe. A hypodermic needle causes a minimum of trauma and is never followed by local infection if the usual sterilisation precautions are taken. (2) It causes a minimum of disturbance and shock to the infant. (3) Many veins are available to the small needle used. (4) Where blood is transfused the introduction of a clot is virtually impossible, and (5) the rate of inflow is limited so that there is no danger of pulmonary œdema or cardiac embarrassment from too rapid an injection.

The disadvantage is that the acquisition of the technique requires time and patience and a good deal of practice.

Clinical and Laboratory Notes

A CASE OF AGRANULOCYTOSIS

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Boyd (1935) recognises three forms of agranulocytosis: (1) a primary form of unknown ætiology; (2) malignant leucopenia of bacterial origin as in pneumonia or osteomyelitis; and (3) a malignant leucopenia caused by benzol, arsenical preparations and certain analgesic and antipyretic drugs (e.g., amidopyrine) which possesses the benzene ring in their molecule. The following case apparently belongs to the first group.

The patient, a man of 23, was admitted to hospital on July 3rd, 1936, with dementia præcox. He was well nourished and apart from several carious teeth showed no abnormal physical signs. Mentally he was dull, morose and apathetic; he had the typical mannerisms of dementia præcox and smiled and giggled foolishly; he talked to himself and was negativistic though he took food fairly readily. His weight was 7 st. 10 lb. He had had no previous illnesses other than a minor accident when aged 5 and had been employed as a labourer since leaving school until the onset of his mental illness two years before admission to hospital. His father and mother were both living and healthy.

After admission his teeth were attended to by the visiting dental surgeon. He ate well and his weight increased to 9 st. 1 lb. His mental condition showed no change but in November, 1936, he became noisy, excited, and impulsive, and a mixture containing sodium barbitone, grains 5 t.d.s., was prescribed on Nov. 9th, 1936. On Feb. 12th, 1937, the dose of sodium barbitone was reduced to gr. 5 b.d., and he continued to take this up to the onset of his present illness on Oct. 28th. In June, 1937, he was given a sulphur and calamine lotion for acne on the back, and this was used for a month.

On Oct. 28th the patient complained vaguely of abdominal pain. At this time he was almost in a state of stupor; he could give no account of himself, and merely put his hand on his abdomen and said "pain." No further history could be taken, for he would not answer any more questions. His temperature was 101·6° F. and his pulse rapid. No physical signs could be found in any system. His throat appeared healthy. There were no signs in the chest, no abdominal tenderness, and no signs of meningeal irritation. The possibility of appendicitis was considered, and he was given an enema. Four hours later the temperature was 105°, the pulse-rate 137, and the respirations 20. He did not appear to be in any distress, and when asked if he had pain said "No." He was kept under close observation. The next day, Oct. 29th, he had a relaxed stool and was incontinent. The stool was fluid, small, and contained no blood, mucus, or pus. The temperature was 104·8°, the pulse-rate 142, and the

respirations 28. There were still no physical signs other than a very slight fullness in the right loin without any local tenderness or rigidity. The urine was normal. A blood count now showed :—

			%
Red cells	5,410,000	Polymorphs	33
White cells	3,000	Small lymphocytes ..	56
Hæmoglobin ..	100 %	Large lymphocytes ..	6
Colour-index ..	0·92	Monocytes	5
Diameter of red cells	7·4μ		

A few normoblasts were present, a few red cells showing basophilic granular degeneration, and a few poikilocytes. No abnormal white cells to be seen.

A blood culture was also made and was sterile.

A diagnosis of agranulocytosis was made and he was given Pentnucleotide 10 c.cm. intramuscularly. On Oct. 30th his condition appeared worse. The temperature was 104°, the pulse-rate 160, and the respirations 28–36. Slight cyanosis appeared in the face. There was little sweating. He did not complain and again there were no physical signs. The throat still appeared healthy; there were a few sordes on the lips. Throughout the day he was incontinent of urine and fæces. Pentnucleotide 10 c.cm. was given intramuscularly in the morning and intravenously in the evening. Also he had two injections of Digitalin gr. 1/100 and strychnine gr. 1/60.

Blood counts at 9 A.M. and 3 P.M. were :—

	Red cells	White cells	Polymorphs %	Lymphocytes %	Monocytes %
9 A.M. ..	—	1800	10·5	88·5	1
3 P.M. ..	4,500,000	400	11	88	1

A few normoblasts were present, and a few red cells showed punctate basophilia. Again there were no abnormal forms of white cells.

At 2 P.M. on Oct. 31st the pulse became so rapid that it could not be counted and he died.

Throughout the course of this fulminating illness, which strongly resembled a septicæmia, there were no hæmorrhages into skin or mucous membranes and the spleen was never palpable.

Post-mortem findings.—It was in the intestines that the only striking abnormality was found. The small intestine showed no change, but the colon was the seat of an extensive necrotic process which appeared to involve only the mucosa. There were several large necrotic patches principally in the transverse and descending colon but also in the ascending part. These patches were covered with greenish-grey debris. Around them there was no inflammatory reaction. The serous coat appeared quite normal. Cultures were made from these patches and showed only the normal intestinal flora. There were no non-lactose-fermenting organisms and no spirochætes.

All other organs were normal in size, colour, consistency, and on section. A portion of bone-marrow was taken from the sternum, and was normal to the naked eye. Smears showed myelocytes and some lymphocytes. No polymorphonuclear leucocytes were to be seen. The myelocytes contained abundant well-staining granules.

This appears to be a case of primary agranulocytosis as distinct from the malignant neutropenia associated with severe infections. The absence of ulcerative lesions in the throat or rectum is a point of interest, especially as a necrotic lesion was found in the colon. A necrotic process of this kind may involve the œsophagus, stomach, or bowel, and is sometimes regarded as primary (McCrae 1935). Another unusual feature is the presence of nucleated blood-cells in the blood films. These were only seen in small numbers, but their presence is noteworthy for they are usually not to be found at all.

Kracke and Parker (1933, 1934) have presented evidence that agranulocytosis may be caused by certain drugs, containing a benzene ring with an attached NH_2 group. The only drug this patient had had was sodium barbitone which possesses no benzene ring and no isolated NH_2 group in its molecule. Available evidence is strongly against such a barbiturate causing the condition, although when barbiturates have been employed in conjunction with amidopyrine they have been said to have an adjuvant effect in producing it. In this case the barbitone was not used in any such combination and it seems unlikely that any causal relationship can be established.

I am indebted to Dr. N. Moulson, medical superintendent, Cefn Coed Hospital, Swansea, for permission to report this case, and to Mr. A. Dignam, laboratory technician at the hospital, for the laboratory investigations.

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BALANTIDIAL DYSENTERY

By D. L. Mackenzie, M.B. Glasg., D.P.M.
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H. Bean
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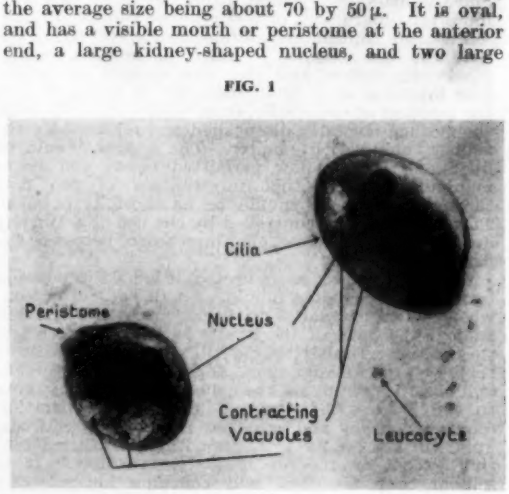
Balantidial dysentery in man, or balantidiosis, is such an uncommon disease that we feel justified in reporting the following case, which, as far as we are aware, is the first recorded in Great Britain.

Before doing so, however, we would like to give a short description of the infecting organism—*Balantidium coli*. First described by Malmsten in 1856, it is a natural parasite of the pig, in which it is apparently harmless. It is a ciliated protozoon, being the largest protozoon and the commonest of the intestinal ciliates found in man. Its length varies from 30 to 200μ and its breadth from 20 to 120μ, the average size being about 70 by 50μ. It is oval, and has a visible mouth or peristome at the anterior end, a large kidney-shaped nucleus, and two large

FIG. 1



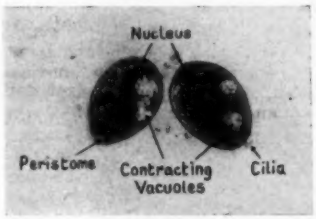
contracting vacuoles. It is completely covered with cilia, which are slightly elongated in the region of the mouth. It rotates in the process of swimming and alters shape readily when in contact with surrounding fæcal matter, particles of which form the organism's main food-supply. *Balantidium coli* multiplies by transverse fission into two daughter protozoa and encysts in the intestine. The cysts, which are passed out in the fæces, are rounded, have a fairly thick wall, and measure between 50 and 60μ in diameter. Each cyst gives rise to only one ciliate. The unencysted organisms are very sensitive and soon die if passed

in fæces, but the cysts can live for several weeks if kept moist.

Man is probably infected from the pig, either directly by eating diseased flesh, or indirectly by contact with pig's fæces or contaminated water. Encystment takes place in the large intestine, and the infection is usually limited to this part of the gut, particularly the cæcal end. The lesions found in the intestine are similar to those found in amœbic dysentery (Blacklock and Southwell 1931).

The patient, a well-nourished female aged 31, in good general health, was admitted to the County Mental Hospital, Rainhill, on Jan. 22nd, 1936. Mentally she presented the typical picture of the katatonic variety of schizophrenia, and since admission she has progressively demented.

FIG. 2



On June 9th, 1937, she was confined to bed with frequent loose stools, but apart from a moderate quickening of the pulse-rate showed no other signs of physical disturbance. Owing to her mental state coöperation was impossible, but she did not appear to have any abdominal discomfort. A blood film examined at this stage showed a relative increase of mononuclear leucocytes but nothing else abnormal. The stools were clay-coloured and contained much mucus and pus, but culture media yielded only the colon group. Smears examined with the microscope revealed large oval organisms darting in and out of the field, propelled by cilia, and moving in a rotary manner. Others exhibited a simple rolling movement, while some, seen imbibing small particles of fæcal matter through the peristome, were stationary. The latter, examined under high power, showed the features characteristic of *Balantidium coli* (Figs. 1 and 2). On one occasion division into two daughter cells by fission was noted.

With treatment (see below) the patient's symptoms gradually cleared up, and, for four months now, no balantidia or balantidial cysts have been detected either in her stools or on rectal swabs.

Dobell and O'Connor (1921) after a survey of the literature could find no specific cure for the disease, but Cort (1928) claimed success with enemata of oil of chenopodium (15 c.cm. in 150 c.cm. of olive oil), and Banik (1935) reports a case treated successfully with Yatren enemas (8 oz. of 2·5 per cent. solution).

Our patient was given an appropriate diet, an astringent mixture, and Chinosol, with no great effect on the parasites. It was noted, however, in the laboratory, while attempting to stain the organisms, intra vitam, with Löffler's methylene-blue, that as they ingested the dye, movement became sluggish and within 10–15 minutes ceased, and they spontaneously disrupted. On this observation it was decided to use the dye in treatment. On June 23rd the lower bowel was thoroughly washed out and 2 pints of Löffler's methylene-blue was slowly run in. This was retained by the patient for two and a half hours and was followed by another washout. The whole procedure was repeated next day. Samples of stools and smears from rectal swabs examined at regular intervals after this revealed no vegetative forms of the organism and a gradually diminishing number of cysts until on July 7th only an occasional degenerated cyst was detected. On July 8th a further washout was given, followed by an injection of dye, and since then neither ciliates nor cysts have been discovered.

The origin of the infection in this case cannot be ascertained. It is difficult to obtain accurate information about the patient's history, but according to her husband she was born in Liverpool and has spent all her life there. She has never lived on a farm or had any contact with pigs; nor was she particularly fond of pork.

We have to thank Mr. T. Southwell, D.Sc., of the Liverpool School of Tropical Medicine, for confirming our diagnosis of the organism, and Dr. E. F. Reeve, medical superintendent of the hospital, for permission to publish the case.

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SUCTION ELECTRODE FOR ELECTRO-CARDIOGRAPHY
ESPECIALLY IN CHEST LEADS

By S. Vatcher, M.D. Camb.
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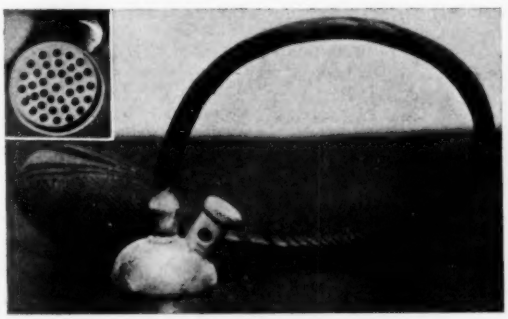
The use of lead IV for the diagnosis of heart conditions not revealed by the three usual leads has recently much increased, and consequently it was natural that a self-adhering electrode that would retain itself in position on the body should be sought after.

As long ago as 1934 Roth suggested such an electrode; but as he had not the advantage of modern electrode jelly it was not a contact electrode, but an ebonite box containing cotton-wool soaked in saline and retained by a vacuum. It was very complicated, involving ten separate operations before use, which probably accounts for the fact that it has not been generally adopted. Holzmann in 1937 described a suction electrode for use with a linen pad soaked in saline, but this again is rather complicated, being, I imagine, very expensive to manufacture; it involves the use of a powerful vacuum pump, is said often to cause bruising or pain in application, and there is difficulty with thin or hairy subjects. For use with electrode jelly, Hall (1937) advocates the use of a special electrode, shaped like a button but otherwise resembling the usual Cambridge electrode. This however requires fixing to the chest wall by means of adhesive plaster—a dirty and unpleasant procedure which involves some subsequent discomfort during removal, and which does not produce a very intimate electrical contact.



The suction electrode, with rubber bulb attached. Inset shows cribriform metal plate for contact with skin.

I have therefore designed a contact electrode, shown in the Figure, which retains itself in position by the suction produced by a partial vacuum.

It consists of a hollow bell, fitted with a terminal and a tube to which is attached a rubber bulb on the end of a rubber tube. Across the mouth of the bell is fitted a cribriform plate of the same metal (German silver) as the bell. (The appliance may be obtained from the Cambridge Instrument Company.)

The skin is cleaned in the usual manner with Cambridge electrode jelly, and a thin layer of jelly left on the surface. The rubber bulb is then squeezed and the mouth of the bell placed in contact with the chest. The bulb is released, and the electrode will be found to retain itself in position, the skin being forcibly drawn against the cribriform plate, resulting in an intimate electrical contact. The appropriate lead is then connected to the terminal and the electrocardiogram taken.

Cleaning is effected by squeezing the bulb several times while the instrument is immersed in water, and then drying.

So successful did this prove with chest leads that I now apply the same principle to the ordinary limb leads; I understand that with young children the much smaller size of electrode (which is possible because of the far superior electrical contact) is a great advantage, as the ordinary Cambridge pattern is very cumbrous for use in these cases. In very hairy subjects shaving the chest may be necessary for chest leads, but I find that in the majority hair is absent from the skin just below the nipple. In very emaciated subjects it might prove difficult to obtain a suitable flat surface to which to apply the electrode, but this difficulty must apply equally to any form of contact electrode. I personally have not yet met a case that presented either of these difficulties.

I invariably use Roth's (1935) method, leaving the right-arm lead on the right arm; after taking the ordinary three leads, all that is necessary is to transfer the suction electrode from the left arm to the cardiac apex for lead IV.

I wish to thank the director-general of medical services at the Ministry of Pensions for permission to publish this description.

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MEDICAL SOCIETIES

LIVERPOOL MEDICAL INSTITUTION

A MEETING of this society was held on Dec. 16th with Dr. R. E. ROBERTS, vice-president, in the chair. Reading a paper on

Gastroscopy

Mr. J. HOWELL HUGHES said that the method, which had been first introduced in 1868, had fallen into disuse with the introduction of the barium meal for radiological investigation, but now had returned with the production of a flexible instrument. The value of gastroscopy was summarised under four headings: (1) Ulcers could be divided into acute, chronic, and a third type associated with stomal ulceration and termed subacute. Gastroscopy was useful in cases of doubt whether the ulcer was simple or malignant, and in judging the response of an ulcer to treatment—absence of a crater by radiological investigation did not mean complete healing. The extent of chronic gastritis associated with duodenal ulcer could be seen and also whether pylorospasm was due to disease of the stomach or was reflex in origin. (2) In cases of neoplasm, gastroscopy would show the extent of invasion, which was usually greater than radiography suggested. (3) In gastritis one could recognise four main types: acute, chronic hypertrophic, specific, and atrophic. The type and activity could only be determined by gastroscopy. (4) After operation the presence of active gastrojejunitis or acute anastomotic ulcer could be confidently diagnosed. The Wolf-Schindler gastroscope and the technique of the examination with the appearances were described with the aid of a film and slides.

Dr. E. L. RUBIN said that the radiological sign of rigidity of a portion of the stomach wall did not always imply extensive malignant invasion of the stomach. This sign, which was strong presumptive evidence of malignancy, was sometimes found beside an ulcer in which evidence of malignant disease was provided only by microscopic examination and where the adjacent stomach wall looked and felt normal at operation. He wondered if the gastroscope could furnish evidence of malignant disease in these cases of mural rigidity without any demonstrable macroscopic lesion.

Femoral Embolectomy

Mr. E. N. WARDLE read a paper in which he traced the history of embolectomy from Suabanejeu's first attempt in 1895. The first success recorded was that of Labey in 1911, and this again was a femoral embolectomy. Key of Stockholm in 1923 collected 51 cases including 12 of his own. Jefferson of Manchester two years later added to this total. The condition usually occurred in patients with heart disease, but several cases had been observed in which this cause could not be found. Success depended largely on removal of the embolus within two hours of its lodgment.

A patient was then demonstrated upon whom Mr. Wardle had operated in November, 1936. The embolism occurred in the left femoral artery, nine days after an operation for an injury to the right ankle; at no time did the patient show any evidence of a cardiac lesion. Four days after its removal he had pain in the chest, but no definite signs of a pulmonary embolus were ever found. He had now a comparatively normal circulation in the leg, without any swelling, even after being on the limb all day.

The questions arose whether the femoral artery was now patent at the affected area and whether it would have been equally effective to tie the vessel above and below the site of lodgment of the embolus and its associated thrombus.

Mr. F. RONALD EDWARDS described three cases in which he had removed the embolus.

The first patient, who had heart disease, had an embolism in the third part of the axillary artery, which was successfully removed. The second had an embolism at the bifurcation of the brachial artery. Removal of the embolus was performed with recovery of the limb, but the patient died three weeks later from cardiac failure. Section of the sutured artery showed normal healing in the wall and the presence of a satisfactory lumen. In the third case, with sudden loss of radial and ulnar pulse, a clot was removed from the bifurcation of the brachial artery. The case, however, turned out to be one of arterial thrombosis, with gangrenous changes becoming manifest in the other limbs.

Brachial plexus block anæsthesia was used in all three cases.

REVIEWS AND NOTICES OF BOOKS

Textbook of Ophthalmology

Vol. II. *Clinical methods of examination, congenital and developmental anomalies, general pathological and therapeutic considerations, diseases of the outer eye.* By Sir STEWART DUKE-ELDER, M.A., D.Sc. St. And., Ph.D. Lond., M.D., Ch.B., F.R.C.S., Surgeon Oculist to H.M. The King; Ophthalmic Surgeon, St. George's Hospital. London: Henry Kimpton. 1938. Pp. 1127–2094. 63*s*.

THE second of the four volumes that will make up this comprehensive work has now appeared after a long period of gestation, for its predecessor was published in 1932. This volume was however worth waiting for. It contains sections on the clinical methods of examining the eyes; congenital and developmental anomalies; and general pathological and therapeutic considerations about diseases of the eyes and diseases of the outer coats—the conjunctiva, cornea, and sclera. The description of the conduct of an ophthalmic examination by both simple and elaborate apparatus is especially lucid and concise. Some 15 pages are devoted to the application of the corneal microscope and slit-lamp to the examination of the anterior segment of the eye. In the section on ophthalmoscopy the author reviews certain methods for localisation in the fundus. Accurate localisation has much practical importance in the modern surgical treatment of retinal detachment, for it is essential to determine before operation the exact site of a retinal tear in relation to the overlying sclera; instruments designed for this purpose are here described. In the account of the main pathological groups in which diseases of the eye may be classified the discussions on metabolic disorders, viruses, allergy, and pigment distribution are of particular interest. This section is well placed in the book, preceding as it does that which describes diseases of the outer eye. The bacteriology of many types of conjunctivitis is fully examined and illustrated by some admirable photomicrographs borrowed largely from Lindner's collection. The section on trachoma is a masterly review of the history of this disorder, its endemiology, pathology, and ætiology. Many splendid coloured illustrations and photomicrographs show the clinical features, slit-lamp appearances, and histopathology of trachoma in its various stages. The references on this subject alone occupy double columns of print on four pages and are an example of the author's intensive research into the original sources of the work he summarises. Conveniently placed at the end of every subsection is a full bibliography, and it is evident that the author has not only noted but has assimilated the mass of material it represents. This work will bring credit to British ophthalmology.

The Hair and Scalp

Second edition. By AGNES SAVILL, M.A., M.D. Glasg., M.R.C.P.I., Consulting Physician, Fitzroy-square Skin Hospital; formerly Physician, St. John's Hospital for Skin Diseases. London: Edward Arnold and Co. 1937. Pp. 309. 12*s*. 6*d*.

SOME new paragraphs have been added and several sections have been rewritten, notably those on pigmentation, the sebaceous glands, and infantile eczema. The distinction between true infantile eczema, infantile seborrhœic dermatitis, and streptococcal dermatitis is made quite clear. The treatment of ringworm of the scalp by X ray epilation is discussed quite fully, but the doses are still referred to in terms of pastilles. The modern method of measuring X rays is in Röntgen units (r) with some form of iontoquantimeter; this enables the dose to be calculated with accuracy and the risk of patches of permanent baldness due to overdosage has thus been practically eliminated. Dr. Savill deals fully with that distressing complaint hirsuties and details the various methods of treatment available. She rightly condemns the use of X rays for this condition and points out the grave results that may follow their use. The electrolysis and diathermy methods of epilation are fully described; perhaps too much space has been devoted to the former method, as diathermy is so much quicker and more satisfactory in every way, that it is only a question of time before electrolysis is discarded for this purpose. The suggestion made in our previous notice of the book that the prescriptions should be written in a more uniform manner has been adopted. The book contains much information which not only dermatologists but others interested in the hair and scalp will find useful.

Principles and Practice of Rectal Surgery

Second edition. By WILLIAM B. GABRIEL, M.S., F.R.C.S., Surgeon to St. Mark's Hospital and the Royal Northern Hospital. London: H. K. Lewis. 1937. Pp. 363. 28*s*.

THIS is a book which has already filled with distinction a vacant place in surgical literature. Now it has been so extensively revised and rewritten as to be almost a new book providing one of the best accounts of rectal surgery in the English language. It has the merit of being complete, yet not too long; it is practical, up to date, and rational in outlook. The teaching is that accepted by most proctologists, and our only adverse comment is that in just a few places a little more information might have been given. There is, for example, no account of operations upon the sphincters for prolapse of the rectum, nor any reference to the work of Westhues and Schmieden on the spread of cancer. These researches have importance in that they show Miles's insistence on the necessity for removal of the lower extremity of the bowel and the tissues in the ischiorectal fossa to be too sweeping; they provide the basis of the revival of conservative methods of excision. Many surgeons would have appreciated a fuller discussion of Sebrecht's operation and others similar to it. But perhaps Mr. Gabriel wished to avoid debatable aspects of his subject. Certainly the reader can be sure that any operations described in this book have proved their reliability. The illustrations are excellent.

Brief Outline of Modern Treatment of Fractures

Second edition. By H. WALDO SPIERS, A.B., M.D., Professor of Orthopædic and Fracture Surgery, College of Medical Evangelists, Los Angeles. London: Baillière, Tindall and Cox. 1937. Pp. 137. 9*s*.

THE writer sets out to give a brief outline of fracture treatment, calling particular attention to its pitfalls, and emphasising those methods that are modern and important. Rather more than a fourth of the book is devoted to the consideration of general problems, the remainder being concerned with individual fractures, classified on a regional basis. The methods

advocated are those of modern fracture practice. The task attempted could hardly be accomplished in 137 pages without careful arrangement and the omission of all irrelevant matter. In these respects the book is weak, particularly in the introductory section. The meaning is in many places confused, and several actual errors remain in the text. The illustrations are line drawings, well chosen, and admirably clear.

Synopsis of Digestive Diseases

By J. L. KANTOR, Ph.D., M.D., Associate in Medicine, Columbia University. London: Henry Kimpton. 1937. Pp. 302. 15*s*.

Dr. Kantor has undertaken a difficult task in condensing and summarising a subject which is essentially a wide and rather diffuse one, but he has undoubtedly achieved a remarkably successful result. Digestive disorders may offer such diverse symptoms, and so often fail to conform to any text-book description that any attempt at a synopsis of them might easily give a wrong impression.

Dr. Kantor has avoided too great a precision without losing balance; indeed, it is a pleasant surprise in so slight a book to find so much helpful information. The arrangement of its subject matter is along customary lines—diseases of the mouth, œsophagus, stomach, duodenum, small and large intestine, liver and gall-bladder being dealt with in that order. A useful chapter on intestinal parasites is included; that on diagnostic tests is perhaps too compressed, especially the account of the stool examination.

The advice on treatment also follows orthodox lines and is in general full enough to enable the practitioner to act upon it without consulting larger text-books. The problems of diagnosis are for the most part well set out, and the results of the author's personal experience are clearly presented for the benefit of less experienced readers.

A useful book, surprisingly complete, concise, and free from the faults so often inherent in a "synopsis." It is a delight to be spared unnecessary padding.

Physical Diagnosis

By DON C. SUTTON, M.S., M.D., Associate Professor of Medicine, Northwestern University School of Medicine; Attending Physician and Chairman of the Medical Division, Cook County Hospital. London: Henry Kimpton. 1937. Pp. 495. 21*s*.

Dr. Sutton has set himself the task of giving a concise account of the methods of physical examination—designed (as one judges) both for the student and the practitioner. He has recognised the value of illustrations to this end and his book is amply supplied in this respect, nearly 300 figures, diagrams, and radiograms being included. Both pictures and text are uneven in merit; for instance, while the coloured plates of the circulation in the normal and in various valvular diseases are likely to be helpful to a student learning clinical medicine, the plate showing bismuthia is of little practical importance. Most of the radiograms are exceedingly good. Dr. Sutton has not scorned to devote some pages to the history of clinical diagnosis and has stressed at the start the need for a psychological assessment of the individual and a balanced consideration of the patient as a whole—habits, régime, and the like—as well as environment, in association with the physical signs.

The main chapters are devoted to the examination of the chest, heart, and abdomen, each with a short account of the main diseases found, the normal physical signs, and the variations present in disease.

The rest of the book is concerned with the general methods of examination, the history, body temperature, and the neurological examination.

Physiological Chemistry of the Bile

By HARRY SOBOTKA, Chemist to the Mount Sinai Hospital, New York. London: Baillière, Tindall and Cox. 1937. Pp. 202. 13*s*. 6*d*.

Mr. Sobotka begins this book with a quotation from Peyton Rous's "Biliary Aspects of Liver Disease," which shows how keen is his perception of the need of the physician to distinguish between academic and applied biochemistry. For example, the clinician wants to know how small a biliary disturbance he can perceive. The answer is that the liver is the most silent of organs if only a moderate fraction of its cells are in a healthy state. The ducts from more than three-fourths of it can be abruptly obstructed, without causing even a ripple on the clinical surface. It would be unwise to conclude that minor degrees of disturbance are not worthy of serious study. Far from taking this attitude, Mr. Sobotka supplies a review so complete that it almost defies criticism. The physiology of biliary secretion, its chemical composition, and the modification of biliary secretion by administration of drugs or pathological processes are all discussed in detail. The only disappointing part of the book is that dealing with the van den Bergh reaction, which is dismissed very briefly. A number of quite important English and continental papers on the subject escape mention, but on the whole the present position of the subject is well displayed.

CORRIGENDUM.—The price of Savill's "Clinical Medicine," tenth edition, published by Edward Arnold and Co., is 28*s*. and not as stated in our recent Review of Reviews (Dec. 18th, p. 1435).

REPORTS AND ANALYSES

ENERGEN NUTRIENT BREAD

(ENERGEN FOODS CO., LTD., LONDON, N.W.10)

IT is claimed for this bread that it is more easily masticated than ordinary bread; that the digestion of the starch is quicker and more easily accomplished; and that in calorie values it is considerably more nutritive than white bread. The sample submitted to us for examination was in the form of rolls and batons, the former weighing 5 grammes each and the latter 15 grammes. They are attractive in shape and appearance and very light. On analysis the following results were obtained:—

Moisture	9·0	per cent.
Ash	0·86	„ „
Protein	44·50	„ „
Fat	0·70	„ „
Crude fibre	0·10	„ „
Carbohydrate (altered starch)	44·84	„ „
Calorie value on sample per lb. 1690 (average for white bread 996).		

On the basis of dry matter the percentage of carbohydrate is 49·2 as compared with 82 for white bread.

A bread of this type should be acceptable to the physician in search of a product with a low content of altered starch and a high percentage of protein.

THE LANCET

LONDON: SATURDAY, JANUARY 8, 1938

NEW BLOOD-SUPPLIES FOR THE HEART

FAMILIARITY with the marvels of surgery makes most of them seem commonplace, but even for the medical man operations on the beating heart still have a dramatic quality. The last few years have seen the beginnings, in this country and in America, of a planned attempt at radical surgical treatment of angina pectoris. We no longer argue whether the classical anginal pain arises in the aorta or in the myocardium. We now regard it as the cry of a distressed heart muscle for more oxygen, for lack of which it cannot beat strongly enough to let its owner walk in comfort or sometimes it cannot beat at all. It has been slowly or suddenly starved of oxygen by the atheromatous or arterio-sclerotic throttling of its own blood-vessels, the coronaries. Why this should happen we have no idea; we often accept it philosophically as part of the process of growing old, and resignedly plan our lives, or our patients' lives, accordingly. If a physician were ever stirred to question that passive philosophy he would no doubt make brave and laborious inquiries into the causes of atheroma, and the influences that may hinder or hasten it, hoping some day to achieve that prevention which is better than cure. Turn to a surgeon, however, and his mind works differently. Tell him the heart lacks blood and he offers to perform an operation for increasing its blood-supply.

On paper it is simple. He knows, since the days of TALMA and MORISON, that he can make adhesions as well as divide them, and since adhesions contain anastomotic blood-vessels he has only to make the heart surface adhere to some neighbouring vascular structure to provide what it needs. In practice, however, that involves a pretty series of problems in technique, and, since the real miracle is the work of the ageing body which has to grow new anastomoses, and enough of them, there is only one way to know whether it works—try and see. The first trials were on dogs, whose coronary arteries were narrowed by silver collars or tied completely; partially freed pectoral muscle or omentum brought up through the diaphragm was then attached to the heart and across the attachment vascular communications developed, which in life would enable a greyhound to run 500 yards in good time and after death could be easily demonstrated by injection methods. The next step was the bold one of doing the same thing in elderly human cardiac invalids. CLAUDE BECK,[1] has operated on twenty-five cases in the United States. He usually uses muscle and fat from the chest-wall for his graft. He introduces some powdered beef-bone round the graft to stimulate a mild inflammatory reaction. He gives quinidine before operation and applies procaine to the surface of the heart, to inhibit extrasystoles and auricular or ventricular fibrillation due to the operative interference. Six of his first twelve patients died, but all of the last nine survived the operation. Three of the survivors dramatically lost their angina and increased their physical activity; most of the rest obtained a material improvement in their symptoms and capacity for exertion. In England the pioneer is Mr. LAURENCE O'SHAUGHNESSY, twenty of whose cases are reported at length in our last issue and in this. His favourite operation is cardio-omentopexy, in which, after a left transpleural exposure of the heart and paralysis of the left diaphragm by crushing the phrenic nerve, a pedicled graft of omentum is brought up through the diaphragm and attached to the heart. Where this seems inadvisable owing to friability of the myocardium he promotes a mild pericarditis, with a view to adhesion, by introducing a preparation called Aleuronat paste. The operation as he describes it is not attended by much shock. Only one patient died on the table, from rupture of a friable right ventricle, and this is an accident that should henceforth be nearly always avoidable. Of the fifteen who had had anginal pain ten were alive six months or longer after the operation; nine of those ten lost their angina, and seven of them were able to resume work which they had previously given up on account of their cardiac disability.

These results, on both sides of the Atlantic, are striking and encouraging, for in such a case the scales are loaded against the surgeon from the beginning: he must restrict his operation, in its early experimental stages, to patients who are hopeless invalids, so that if he benefits even a substantial fraction of them he has done well. Later he may find it justifiable to operate on less severely damaged hearts, and he may be able to alleviate cardiac symptoms other than angina, as O'SHAUGHNESSY has attempted to do in the five cases of his second group. At all times, however, the choice of patient will be a difficult and intricate problem. That precision of diagnosis, assessing both the nature and the extent of damage, which the cardiologists have slowly been building up for years, will be an indispensable guide in the application of this new treatment. Not only must it be shown that the heart to be operated on is ischæmic, but it must be judged whether its disability is due to the death of many of its muscle-fibres and their replacement by fibrous tissue, to weakness of living fibres or the production of pain from restriction of their blood-supply, or to disturbances of rhythm produced by organic ischæmic lesions in the conducting system. In such varying circumstances operation is likely to offer varying prospects. Moreover the degree of disability in each case will vary, and different modifications of technique will have to be tried. The result in a given patient will not always be easy to assess. Bold as the surgeon may be he will not be happy in this involved study without

[1] Feil, H., and Beck, C. S., *J. Amer. med. Ass.* 1937, **109**, 1781.

the coöperation of the cardiological physician. It is good, therefore, to see Mr. O'SHAUGHNESSY's name accompanied by those of Lord DAWSON, Dr. DAVIES, and Dr. MANSELL. This is team-work of the right kind; it has been facilitated by the London County Council; we look forward to seeing it make rapid and solid progress in the fascinating field in which it has made such a promising beginning. We scarcely hope for any great reduction in the death-rate from coronary disease, which the Lambeth workers take as the starting-point of their paper; for the sclerosing process, even in the presence of anastomoses, is likely to advance. Nor do we quite share the attitude of CLAUDE BECK who sees in the absence of normal anastomotic communications between human coronary and extracardiac vessels a "grievious mistake" on the part of Nature susceptible of correction by man. But we see the prospect of added months and years of active life and comfort for a group of people whose bodies usually have been ageing faster than their minds. Such rejuvenation will be a great achievement.

THE RED CROSS: AN END OR A BEGINNING?

IN the evolution of many animals, and especially of man, the struggle for existence has been profoundly modified by the biological after-thought called mutual aid. The struggle is inevitable and eternal, but mutual aid goes far to convert it into a contest between families, tribes, groups, and races, rather than between individuals; it organises men into larger and larger units for their warfare against strangers and for their effort to secure a living from the earth. So much has been made obvious, and it governs everybody's outlook on the present and the future. The lesson that each man draws, however, will depend upon his idea of the unit inside which he thinks mutual aid practicable. The emotional bonds naturally weaken as we pass beyond the circle of our family and friends, but for the average European of the past few generations the essential borderline between friend and foe has been the frontier of his country. To most of us it still seems natural to have sharp national divisions between English and Germans, Chinese and Japanese—divisions meaning that at a given signal the people of each category must act as a unit practising mutual aid (or charity and friendship) only among themselves and recognising no obligation towards the enemy save the obligation to destroy him. Nevertheless the practice of kindness in peace-time, and praise of it from the nursery upwards, makes it difficult all at once to decide that the foreigner has no rights as a fellow man, and in practice the horrors of warfare have hitherto been softened in a small way by conventions, rules, and regulations giving rights to wounded and prisoners and civilians on one side in return for similar rights on the other. Such arrangements—such attempts to "humanise" war—are apparently laudable; but if they involve, as they often do, a disadvantage to one's own side without a certainty of equal or greater advantage later they are an illogical endeavour to serve God at a time when one is temporarily dedicated to Mammon. This was all very well when war was more of a game, when it was waged between kings and governments; but it is increasingly impossible now that it is waged between whole nations and is correspondingly more serious. The aeroplane and the blockade have extended the boundaries of warfare so that every civilian becomes a combatant.[1] Those who make war to-day intend to win at almost any cost, and it is not surprising to find them more and more inclined, for example, to torture and kill their prisoners when it suits them and to bomb hospitals by way of routine.

The red cross is a symbol of neutrality—comparable to a flag of truce under which the wounded are rescued and cared for. The wearer of this badge has certain privileges and in return for them agrees to bear no arms and to render similar service to the enemy if they take him prisoner. The idealist may therefore look upon the red cross worker as the representative of peace in the midst of war, of sanity in the midst of madness—a man serving something higher than either combatant can serve. And we do not deny that this is sometimes so. The military authorities however, more realistically, regard their medical corps merely as auxiliary services necessary to success in any large or prolonged operations in the field. The value of a doctor to them is such that during the late war they recalled medical students who had been expensively trained as combatant officers and sent them back to medical schools to qualify as non-combatant medical officers. To-day we see the Committee of Imperial Defence taking steps to secure the aid it would urgently need from medicine if war were to break out; and this is only its duty. The plain fact is that the doctor serving a modern army in any capacity is no more neutral than the munition-worker or the artillery-man. And since he is not neutral he will be bombed. And when he is bombed he will be compelled to remove or camouflage the red cross that no longer protects him—as had to be done by hospitals in Abyssinia and is being done by hospitals in Spain. The logic of events and of "totalitarian" war lessens the distinction between medical and other branches of the fighting services and brings the medical profession and such organisations as red cross societies and ambulance associations into the direct service of the military authorities, which in war control the State. Hence the red cross loses its significance and may as well disappear. It remains no doubt a convenient sign for a dressing station, displayed for friends rather than the enemy; but it is no longer a symbol of neutrality and no longer a symbol of a service that recognises no difference between men of differing beliefs and races.

A proportion of doctors in this country have been shocked at the thought of being enrolled for war service, and in a letter that we published on

[1] This tendency is discussed by Mr. T. B. Layton in a review published in the *Guy's Hospital Gazette* for Nov. 6th, 1937, p. 474.

Dec. 18th the committee of the Medical Peace Campaign speak of the "independence of conscience and judgment to which the profession is entitled and which it is its duty to claim." We cannot see that the members of our profession are entitled to any more independence of conscience and judgment than the butcher, the baker, or the candlestick-maker; but there are certainly reasons why their opinions might in fact differ from those of men and women engaged in other work. In the first place they may feel that their everyday endeavour to relieve misery and save life—none too successful at best—is betrayed and almost made ridiculous if they must be ready at any moment to take part, even as auxiliaries, in wholesale damage to human bodies and human happiness. Secondly, they are in a peculiarly favourable position to understand the emotional disorders causing war and to realise its needlessness and biological futility. Thirdly, and most important, they have all more or less consciously accepted the advanced creed defined in the declaration used as a motto by one of our hospitals: *Homo sum; humani nihil a me alienum puto*—a statement that the doctor will serve all mankind, finding nothing and no one unclean. To-day the large majority of Europeans are patriots and content to be so. A large minority have found new and over-riding loyalties in the extranational struggle between capital and labour and are willing to go to any lengths for the benefit of Left or Right. A third group, however, believes that a loyalty more comprehensive than either of these is needed; that the principle of mutual aid must be applied to mankind rather than to sections; that war between men no longer serves a biological purpose; and that the true struggle for existence, which alone justifies the sacrifice of life, is the struggle of man as a whole against nature. It is easy to belong to this group in theory, but excessively difficult in practice; for the belief is useless unless it means that the believer takes no further part in the internecine struggles of class or country. Nor must he stop there, for the service he would have given to country or class should belong to the race, and he must try to redress wrongs or mitigate suffering wherever he finds them, abroad as well as at home. None will deny that much work of this kind is already being done by the medical and allied professions in all countries, and it is imaginable that a definite movement towards construction rather than destruction could be founded within these professions, its members binding themselves not to give any active help in the prosecution of war but otherwise to work for the relief of suffering at all times. An organisation with this aim would have to prove its worth in peace even more than in war and would have to adopt some of the methods, as well as the traditions, of other bodies of men who have achieved miracles by coöperation and self-denial. But in its attempt to rise above prejudice it would essentially represent a revival of the idea underlying the red cross, and it might gain many adherents among those who believe that, despite all the complexities of ethics and the arguments of militarists or economists, it is wise in the long run to succour the afflicted. In so far as mutual aid is in truth the main civilising force among men this new red cross would be a banner of civilisation, as the old has often been; and those who fought for it would be able to bring a positive ideal before a world that is unquestionably asking for positive ideals. In this campaign, however, they would need more than heroism; they would need a change of heart. For in the circumstances of to-day it is all too evident that nearly all of us are English or German or Japanese or communists or property-owners before we are doctors and scientists.

THE LONDON M.B. FINAL

IT has long been a matter of concern in university circles that nearly half the medical students who pass the 2nd M.B. Lond. fail to obtain a degree. They qualify as doctors by taking a registrable diploma and many never even sit for the final M.B. examination. Most if not all of them genuinely intend to continue work for a degree; but the temptation to rest at the attainment of a qualification that is everywhere respected may prove irresistible. Even those more resolute or ambitious men who eventually graduate usually sit for the Conjoint first, and for a variety of reasons: they are eligible for it earlier; it is reputed to be easier; it can be taken in a leisurely stride, that is in four parts (with intervals between them) rather than as a whole, or at best in two parts with a consequent delay of six months. Success confers a professional status only slightly less dignified than that of graduation; and to the public at least eight capital letters are as impressive as four. The extra fee—some 40 guineas—is balanced by the ability to start earning, if only board and lodging, a few months earlier. A reason not perhaps given full weight in discussions on this tendency to default from the academic ideal is the force of custom. It has become customary in London to take the diploma on the way to a degree almost as a matter of course, and students are convinced that there is some advantage in doing so; in fact in some hospitals a man who does not qualify with his fellows but waits to take a degree is held to run a risk of being passed over for a house appointment when competing with the next batch. At any rate there seems to be no deliberate policy of discouraging a procedure that certainly contributes to the prosperity of the Royal Colleges, to which most clinical teachers at the hospitals feel at least as much loyalty as to the University.

The hospital medical schools in London are recognised schools of the University. If they were not, and if they were heavily endowed or self-supporting from fees, or were even partially subsidised by the Royal Colleges, they would be under no obligation to swell the M.B., B.S. pass list. But nowadays a medical student's fees go only a little way towards meeting the cost of his education, and the grant allocated by the State to his school through the University Grants Committee is by definition given to promote

training of university standard. It was after representations from this committee a year or two ago that the deans of some of the schools made it clear that in the selection of students those entering for a degree would have preference. In practice however such a policy affects the potential rather than the actual number of graduates emerging from the school. Several ways of meeting the situation have been suggested, but none that would not entail some loss of prestige or of money for one of the three bodies concerned—the University, the Royal Colleges, or the medical schools. Complicating factors include the external side of the University, ever vigilant to safeguard its privileges, and the objection to any arrangement between the University and the Colleges that is not applicable to Oxford, Cambridge, and other universities whose students do clinical work in London. It is an open secret that attempts have been made in conversations between representatives of the University and of the Royal Colleges to seek a basis for some amalgamation of the two examinations. The mechanism of such a compromise—whether enabling the diplomate to graduate by taking certain supplementary papers, or raising the standard of the Conjoint Board's examination in certain respects to meet university views—is not at the moment the thing that matters.

It is the principle whether it is for the University to take any steps at all—beyond perhaps modifying the severity of the test—that has been debated with some heat. The University has been enjoined on the one hand to be jealous of its academic status, on the other to show common sense in trying to reach adjustment that will bring to an end profitless rivalry. The fact that some of the protagonists are in the inner counsels of both university and colleges has led to a certain conflict of loyalties. The recent election of Mr. P. H. MITCHINER to the senate of the University will strengthen the party opposed to the delegation by the University of its exclusive right to test the competence of its students. It is a secret as open as that of the "conversations" that the appropriate boards of the University have recently been considering the revision both of the curriculum and of the examinations, in the light of the report of a joint conference which included representatives of the universities of London, Oxford, and Cambridge, of the Royal Colleges, and of the Society of Apothecaries. The wisest action would seem to be to expedite the introduction of any changes designed to make a medical degree, as much in London as elsewhere, the normal sequence of an ordinary conscientious undergraduate's course of study.

ANNOTATIONS

"PHENYLPYRUVIC OLIGOPHRENIA"

THE standardisation of nomenclature in medicine is an ideal at present very far from being realised. Nevertheless it must be exceptional for a rare syndrome to acquire five or more titles within three or four years of its recognition. Imbecillitas phenylpyruvica, phenylpyruvic amentia, phenylketonuria, and Fölling's syndrome are terms that have been interchangeable until recently and now Jervis,[1] in an introductory study of 50 cases, proposes the name phenylpyruvic oligophrenia. The condition thus variously described is one that has great intrinsic interest alike for psychiatrists, biochemists, and students of heredity. Familial association between imbecility and the urinary excretion of phenylpyruvic acid was first noticed by Fölling[2] in Norway, and shortly afterwards cases were identified in England,[3] France,[4] and the United States. Like alkaptonuria the disease is inherited recessively, and Jervis has been able to show, by the use of methods devised by Weinberg and Hogben, that the ratio of affected to normal children in families where the disease occurs is in very close agreement with mendelian expectation. The parents of patients have always hitherto been described as normal, but in one of Jervis's cases an affected female imbecile had four children of whom two were likewise affected. If the disease is recessive the father of these children must have been a carrier—a probable circumstance only if he were a blood relative of the mother—but unfortunately no facts about the father are given. In three of the cases, however, both parents were normal and consanguineous.

Among Jervis's cases there were twenty males and thirty females. All were mentally defective and the majority had intelligence quotients below 25. On neurological examination several showed rigidity, active deep reflexes, and other signs that are interpreted by Jervis as evidence of an extrapyramidal syndrome. The Wassermann reaction was negative in every case. Some patients were subjected to feeding experiments and the results of these were similar to those obtained by Penrose and Quastel,[5] tending to confirm the view that the fundamental abnormality is inability to break down phenylpyruvic acid. Jervis's work, which we hope will soon be published in full, is a valuable addition to knowledge of this remarkable abnormality.

LONDON WELL WATER

IN addition to the river water from Thames, Lee, and New River, the people of London, as Colonel Harold reminds us,[6] derive their supply from 55 chalk wells, some of which extend down into the greensand. In the early days of the Metropolitan Water Board's activities water from the chalk enjoyed a deservedly high reputation for purity. Chalk, being a relatively compact but porous material, is a good filtering medium, and its basic character favours the oxidation of nitrogenous organic matter to nitrate, provided sufficient oxygen is dissolved in the percolating water. The removal of bacteria should be considerable, so long as the compact nature of the medium is maintained. On the other hand, percolating water which has become highly charged

[1] Jervis, G. A., *Arch. Neurol. Psychiat., Chicago*, November, 1937, p 944.
[2] Fölling, A., *Hoppe-Seyl. Z.* 1934, **227**, 169.
[3] Penrose, L. S., *Lancet*, 1935, **1**, 23 and **2**, 192.
[4] Rhein, M., *C.R. Soc. Biol. Strasbourg*, 1936, **122**, 807.
[5] Penrose, L. S., and Quastel, J. H., *Biochem. J.* 1937, **31**, 266.
[6] Metropolitan Water Board: 31st annual report on water examination. By Lieut.-Col. C. H. H. Harold, M.D., D.P.H. London: P. S. King and Son. Pp. 117. 10*s.* 6*d.*

with carbon dioxide from the soil air dissolves some of the chalk in its passage to form calcium bicarbonate, the water thereby acquiring its characteristic hardness and the chalk itself becoming less compact. Under natural conditions or when a well has been sunk and the demand for water is not excessive this effect may be insignificant, but with increased pumping and deepening of the well to tap a larger area the conoid of supply becomes greater and much of the water reaches the well by relatively rapid routes through swallow holes and fissures, new channels being formed as a result of solution and erosion. Colonel Harold puts it this way. With the widely diffused systems which abound in the chalk it is obvious, he says, that healthy conduits or fissures may have access to or communication with those bearing impure water and, by the erosion resulting from pumping, intercommunication may be enormously facilitated. For such reasons the passage of swallow-hole water may be traced to wells some miles distant within 72 hours. It is therefore essential, he remarks, particularly with chalk wells going straight into supply, that changes or alteration in bacteriological quality should be detected at the first possible moment. During the thirty-one years of water examination under Colonel Harold and his predecessor, the late Sir Alexander Houston, continuous records have accumulated of the bacterial and chemical characters of London waters under every meteorological condition. These findings have led to the crystallisation of ideas regarding the controversial coli-aerogenes pollution. The first evidence of deterioration of the quality of water in a well, even before an increased colony count, may be the appearance of atypical coliform organisms, which may increase to a concentration of one or more per mil before the typical colony appears. In other words the danger sign, or red light, of pollution is the atypical coliform organism. As the degradation of the well progresses, typical dominance is established and this becomes more apparent with the use of preferential methods of isolation. When the general level of water is high and especially where, as in the northern district under the Board's control, the chalk is covered by clay the movement of water underground is less rapid and less direct than in times of drought, and the water pumped from a deep well is mainly that which has been underground for a long time with better opportunities of filtration and of removal by death of organisms of all kinds. The worst combination of circumstances is for drought, which has served to emphasise the existence of channels, to be succeeded by periods of heavy rainfall, as occurred in 1935–36. If the drought and the break thereof did nothing else, Colonel Harold concludes, it permitted of a critical and controlled study of the advance of pollutions from the minor to the more serious stages, when in every instance the application of chloramine treatment closed the chapter.

AGRANULOCYTOSIS AND ITS TREATMENT

Dr. Preben Plum publishes his own experimental and clinical observations on 88 cases of agranulocytosis in the form of a monograph [1] which includes a review of the literature of the subject, with over 400 references. The result is a concise and valuable summary of present knowledge, well illustrated by diagrams, tables, and pictures of the marrow obtained at autopsy and by sternal puncture. He concludes that, in Denmark at least, amidopyrine is by far the commonest cause of the disease, and advises that the use of this drug for any purpose should be forbidden. The curves for the consumption of amidopyrine and for the incidence of agranulocytosis in Denmark run parallel, and continuing work described in our columns three years ago [2] Plum was able to demonstrate that in persons sensitive to amidopyrine small doses of the drug produce a decrease in the immature granulocytes of the bone-marrow preceding a fall in the number of circulating granular cells. He found that other drugs had no such effect in these people, while amidopyrine was without influence on the marrow of non-sensitive persons. His case reports show further that clinical symptoms are preceded by these changes in marrow and peripheral blood. From his own experience he attributes little value to any therapeutic measure, and in this connexion a recent report from France is of considerable interest. Dr. Ravina [3] discusses 3 cases of agranulocytosis treated in different German clinics with transfusions of blood from patients with myeloid leukæmia: in one of them fourteen transfusions were given, in another recovery followed two transfusions of 500 c.cm. It is suggested that the high white cell content of the leukæmic blood sufficed to tide the patients over the period during which their own marrow was out of action, and also acted as a stimulant to leucopoiesis. Admittedly in one case radiotherapy and pentose nucleotide were also given so that the value of the leukæmic transfusion is by no means certain. On the other hand the prognosis in this condition is so bad that if the leukæmic blood is available its effect ought to be tried more carefully.

[1] Plum, P., Clinical and Experimental Investigations in Agranulocytosis. Copenhagen: Arnold Busck; London: H. K. Lewis and Co. 1937. Pp. 410. 18s.

WORKMEN'S COMPENSATION FOR SILICOSIS

THE diversity of methods adopted in applying the principle of compensation for silicosis in different countries is shown by the report summarised on another page. The methods in use fall into two main groups: (1) silicosis classed with other industrial diseases and, like them, assimilated to the compensation law relating to accidents; and (2) special legislation introduced to deal expressly with silicosis. The question arises which method has greater advantages. The first, adopted in Germany and more recently in a number of other countries, involves the inscription of the disease on the schedule of industrial diseases covered by the Workmen's Compensation Act, and followed by the usual procedure of examination of a claimant by the appointed practitioner and payment of compensation by the last employer. It seems on the face of it a convenient method; but silicosis presents some peculiar characteristics. First, it is insidious in onset and slow in development, making difficult the apportioning of liability among different employers. Secondly, its diagnosis is difficult in the early stages; the International Labour Conference (1934) resolved that only medical men specially qualified and suitably equipped, especially with radiological facilities, should be entrusted with the diagnosis and certification of silicosis. Thirdly, the gradual development of the disease might lead some employers to discharge workmen with suspicious symptoms, in order to evade a possible liability.

For such reasons the British Committee on Compensation for Industrial Diseases (1906) favoured special trade insurance schemes for silicosis, rather than its inclusion in a schedule with other industrial

[2] Plum, P., *Lancet*, 1935, **1**, 14.
[3] Ravina, A., *Pr. méd.* Dec. 8th, 1937, p. 1760.

diseases. The South African Government, faced with the problem in an acute form, followed the recommendations of the committee in setting up their special legislation. The South African system was devised to deal with one industry (gold-mining) in a well-defined area—the Witwatersrand. By means of central compensation funds to which all scheduled mines contributed, compensation was assured to workmen migrating from one to another, and to those who had contracted the disease in a mine subsequently closed. Diagnosis by private medical practitioners having been tried and found unsuitable, the responsibility was placed in the hands of a medical bureau of whole-time experts, who made initial and periodical medical examinations. In Great Britain many industries were involved, and processes scattered throughout other industries and subsidiary to their main purpose had to be covered; to meet this position legislation within the Workmen's Compensation Acts was introduced in the form of an enabling Act which gave power to make suitable schemes. The first and one of the later schemes provided for a central fund maintained by contributions from all employers in the industry. Medical examinations were first made by the tuberculosis officers of local authorities, and later by a whole-time medical board, who also issued all certificates for compensation. This last provision was later extended to the other schemes.

The fully developed system of South Africa probably provides the most precision in diagnosis and equity in administration. The two fully developed schemes in the British system are of the same order. Under the system of blanket coverage in force in parts of the United States insurance carriers are required by law to cover by compensation insurance any employer who is entitled to insurance coverage, and to assume their proportion of unwanted risks. Advocates of this system regard any other as unjust, illogical, and ineffective; those against it point out that with laws having no schedules payment of compensation is often delayed, and legal and other entanglements may arise. An important defect in both blanket coverage and the inclusion of silicosis in a general schedule seems to be the absence of special medical tribunals with definite standards of diagnosis. Any system of compensation for silicosis should be considered in its relation to preventive measures. Those which have the effect of stimulating active measures and research will be the most successful in the long run.

SUCTION LAVAGE OF THE NOSE

ONE of the difficulties encountered in nursing patients with scarlet fever, measles, or diphtheria complicated by rhinitis or sinusitis is the difficulty of clearing away the profuse discharge. This also arises sometimes in other forms of rhinitis and sinusitis, while in ozæna the removal of crusts is apt to be troublesome. They are usually got rid of by nasal irrigation with syringe or douche-can, or simply by snuffing the lotion from the palm of the hand; but irrigation may cause harm by the entry of fluid into the sinuses or middle ears, and to avoid this risk Dr. King,[1] of Peiping, has devised a method whereby the lotion is sucked through the nasal passages under negative pressure. A nozzle is inserted into one nostril and connected through rubber tubing with a douche-can, the fluid in which is kept below the level of the nose, while a second nozzle in the other nostril is attached through a wash-bottle to an electric or water suction pump. The patient continues to breathe through the open mouth, and the negative pressure tends to draw up the soft palate and shut off the nasal passages; this is necessary for the suction effect and, if the flow does not start, it can be helped by the patient pronouncing the letter K to raise the palate. A small hole may be cut in the tubing near the inlet nozzle to admit air and, controlled by a finger, to make the flow intermittent; an interrupted flow has been found preferable to a steady stream. A similar hole in the outlet tube, kept covered by a finger, can be used to release the suction should it become uncomfortably strong. The method has proved highly satisfactory in the Peiping Union Medical College Hospital. It is fairly simple and deserves a trial elsewhere.

[1] King, T., *Chin. med. J.* November, 1937, p. 739.

HARVEY'S HOUSE AT COOMBE

IN his will written with his own hand about the year 1652 William Harvey refers to "all that Linnen householdstuffe and furniture which I have at Coombe near Croydon." It was at Coombe also that towards the end of 1650 Dr. George Ent, president of the College of Physicians, made his historic visit to Harvey and obtained the manuscript of "De Generatione." A further point of interest regarding this residence is that, according to John Aubrey, the house had "a good aire and prospect" and Harvey had caves made there in the earth in which he meditated in the summer. "He did delight to be in the dark, and told me he could then best contemplate." It is perhaps hardly surprising that in spite of the numerous attempts that have been made to obtain further information concerning William Harvey, nobody has yet succeeded in identifying the position of his house at Coombe. The researches of Mr. Clarence Paget however, the secretary of the Record Society, who lives at Croydon and has recovered much of its past history, have now brought to light new evidence that places the site of the Harveys residence at Coombe beyond reasonable doubt. From his latest publication[1] it would seem that the house now known as Coombe Lodge was formerly the mansion of the whole estate, and Mr. Paget shows that in September, 1624, this Coombe property was purchased by George Mellish, "citizen and merchant taylor" of London, who was brother-in-law of Daniel, the brother of William Harvey.

In a deed dated Oct. 1st, 1641, Daniel Harvey purchased for £1200 all the freehold estate of his brother-in-law at Coombe. In this surrender the house is described as being then in the tenure of Daniel Harvey, Esquire, of London, or his assigns, and long before this date there is evidence in the Parish Register of Croydon of a close connexion of the Harvey family with the parish. Thus under the date of July 1st, 1625, there is an entry of the burial of a Daniel Harvey, presumably a child of the doctor's brother. Hannah, daughter of Daniel Harvey, was baptised on August 28th, 1634, and buried two days later. Another daughter Sarah, afterwards the wife of the second Viscount Bulkeley, was baptised in 1636, and a son William was baptised on August 18th, 1637, and buried two days later. Thomas, son of Eliab Harvey, was baptised in September, 1636, and buried seven months later. All these entries suggest that Daniel Harvey was tenant of his brother-in-law's house at Coombe for some years before he actually became its owner.

At the manor court of October, 1641, at which Daniel Harvey was admitted to the Coombe property,

[1] Croydon Homes of the Past. By Clarence G. Paget. Croydon: the Central Library. 1937. 2s.

he also obtained permission to enclose 120 feet of the common called Coombe Heath adjoining his house and thereupon to erect stables and outbuildings, paying yearly to the lord of the manor for the same fourpence. Reference to this additional 120 feet of land lying near to the manor house upon part of which there was a stable erected was made when Coombe Lodge was sold in 1831, and this clearly identifies Daniel Harvey's house with Coombe Lodge. In October, 1640, another of the Harvey brothers, Mathew, purchased for £500 a messuage in Coombe with 12 acres adjoining it. In Mr. Paget's opinion this house and its grounds in all probability adjoined the Coombe Lodge estate on its eastern side, and a good residence can be traced to have existed on that site until about the end of the eighteenth century, when it was either pulled down or incorporated with Coombe Lodge. After two years, in 1642, Mathew Harvey died and was buried at Croydon; the entry in the Parish Register in the vicar's handwriting being as follows: "1642, December 30th, Mr. Mathew Harvey, a worthy gentleman, merchant of London was buried." In his will dated August, 1642, Mathew Harvey left all his property in Surrey to Daniel the younger, the son of his brother Daniel, who thus became possessed of his uncle's estate at Coombe as well as that of his father which he inherited a few years later.

Daniel Harvey sen. fell into trouble with the Parliament, who assessed him in a fine of £5000. He refused to pay, and in 1644 his rents, goods, and estate were ordered to be seized and sold, and he was imprisoned. Eventually, after paying £3000, Daniel was ordered to pay another £1000 for his discharge. He did not long survive this ordeal, and the death of Daniel Harvey was presented at a court of the manor of Croydon on Oct. 24th, 1647; his son Daniel, then a minor of sixteen in the custody of his mother, succeeded to his Coombe estate. In his will Daniel Harvey left his brother William £1000. Daniel Harvey jun. had a distinguished career. He was educated in Croydon by Mr. John Webb, the master of Whitgift's Free School, between 1639 and 1643. He was knighted at the Restoration in 1660, and was later ambassador at Constantinople. In 1662 he sold his estate at Coombe to John Pinsent of Lincoln's Inn, and went to live at Coombe Nevill, near Kingston-on-Thames.

Mr. Paget is to be congratulated on having brought to light this new information concerning the Coombe estate of the Harveys. Coombe Lodge, a beautiful old red brick house, is now in the possession of Sir Herbert Brown. We may well hope that some day will be found the caves in which William Harvey contemplated to such purpose.

PAINLESS CARDIAC INFARCTION

THE most familiar clinical picture of cardiac infarction is the one in which pain and shock are combined at the onset, and later as these clear up the not infrequent appearance of congestive heart failure. But instances are not rare in which any one of this triad may alone be present at the onset. For example, in a patient already showing some symptoms of congestion, the only expression of an infarct is a sudden increase in these symptoms—it has long been known that anginal pain and congestive heart failure are to a great extent antagonistic. Another variant is sudden collapse, the picture being that of severe shock. Apart from those cases where there is infarction in an already failing heart, the absence of pain may perhaps be accounted for by the variations in the sensitivity of the central nervous system. Boyd and Werblow,[1] however, mention the possibility of a local lesion in the cardiac nerves being responsible. They consider that a previous infarction may have interfered with the function of the nerves so that a second infarction near-by might involve an insensitive area. Pain was absent in a third of a series of 127 patients. In 7 illustrative cases, the details of which are described, the symptoms were those of failure or shock, or both. Dozzi[2] mentions another guise that these cases may assume. Cerebral embolism is of course a recognised complication of cardiac infarct and cerebral thrombosis may also occur as a consequence of the lowered blood pressure. He points out that when this follows an atypical onset, the case is apt to be diagnosed as one of cerebral vascular accident only, the primary cardiac lesion being overlooked. The patient's mental condition does not allow him to give much help in the history, which adds to the difficulty. In 1000 consecutive autopsy reports Dozzi found 12 instances of cerebral thrombosis or embolism among 41 of cardiac infarct; but the cardiac lesion was suspected in two only. This unusually frequent association of the two lesions suggests that in all cases of cerebral vascular accident, the possibility of a primary cardiac lesion should be borne in mind.

FRACTIONATION OF ANTIHORMONE SERA

THE production of serological antibodies against the protein-like hormones was discussed in these columns a few months ago.[3] A further contribution to the study of this phenomenon has been made by Prof. Harington and Dr. Rowlands, with the coöperation of Dr. Hartley,[4] and they are able to describe chemical fractionation of antithyrotropic and antigonadotropic sera. Antithyrotropic serum was prepared by injecting a crude extract of ox pituitary into rabbits, and the potency of the rabbit serum or fractions thereof was tested by its power to inhibit the effect of a standard preparation of thyrotropic hormone in immature guinea-pigs. Antigonadotropic sera were prepared with three different materials—viz., by injecting crude ox-pituitary extract into rabbits, by injecting an extract of pregnancy urine into a goat, and by injecting pregnant mare serum extract into rabbits. The antigonadotropic activities were assayed in the first case by the effect on ovulation in rabbits after mating, and in the other two cases by the inhibition of gonadotropic activity in immature rats of preparations similar to those employed to produce the antisera. So far fractionations have been carried out by orthodox but relatively crude methods, but the results show quite clearly that the "anti" effect is associated with substances that go almost quantitatively into the globulin fraction. Antithyrotropic activity is associated with the pseudoglobulin fraction, whilst antigonadotropic activity is divided between the pseudoglobulin and the euglobulin fractions. The dried fractions were stable on storage, but the activity was destroyed by heating. The theoretical importance of these observations lies in the demonstration that the so-called antihormones behave like other well-known antibodies, in a way completely consistent with the assumption that they are protein-like antibodies whose formation is provoked by protein-like antigens.

[1] Boyd, L. J., and Werblow, S. C., *Amer. J. med. Sci.* December, 1937, p. 814.
[2] Dozzi, D. L., *Ibid*, p. 824.
[3] *Lancet*, 1937, **1**, 1471.
[4] C. R. Harington, F.R.S., and I. W. Rowlands, Ph.D., *Biochem. J.* 1937, **31**, 2049.

The bringing of antihormonal effects into line with antigenic phenomena renders still less probable the hypothesis once discussed that internal regulation of the active hormonal level in the body proceeds by the same mechanism as that acting when animals lose sensitivity to injected extracts.

Practically the value of this new work lies in the preparation of stable concentrates. This is a step in the direction of producing material suitable for clinical application, which as yet is only entering the experimental stage.

TOMOGRAPHY OF THE LARYNX

TOMOGRAPHY is a method of radiography that gives good definition of the structures at a particular chosen level, and leaves the rest, so to speak, out of focus. It has already proved helpful in the examination of the lungs, and Canuyt and Gunsett [1] of Strasbourg recommend it for the study of disease in the larynx. Ordinarily radiograms of this region are taken in the lateral position, giving a profile view in which the image of one side of the larynx is superimposed on that of the other side, and this makes it difficult or impossible to judge exactly the form and extent of a tumour. Likewise an anteroposterior radiogram is obscured by the shadow of the vertebral column. This difficulty is avoided by tomography, which provides an arteroposterior picture—in effect, a radiographic section—at any required level; for example, through the centre of the glottis or in the arytenoid region. Several radiograms illustrate Canuyt and Gunsett's paper, and though it is not fair to judge them by their reproductions three pictures of the normal larynx show clearer detail than could be obtained by other methods. Radiography takes a relatively small place in the diagnosis of disease of the larynx, but it can render good service on occasion, especially in determining the degree of subglottic extension of a malignant growth. For such a purpose tomography seems to be a notable advance in technique.

NEW DEVELOPMENTS AT THE CHRISTIE HOSPITAL, MANCHESTER

TWO major schemes which are now near completion at the Christie Hospital and Holt Radium Institute will greatly improve the facilities for the treatment of cancer in Manchester. One is the provision of a special pavilion for private patients built in response to a demand, endorsed by the National Radium Commission, that the full advantages of modern radiation therapy should be made available to all classes of the community. The provision of accommodation for private patients in a large treatment centre with a team of trained workers is the only method of meeting this demand; and the fact that the Christie Hospital also supplies a highly specialised surgical service enables combined treatment to be undertaken. Part at least of the accommodation in the main building that will be set free when the new rooms are ready is to be used to extend a scheme already initiated—the provision of dormitory beds for patients from a distance who require X ray treatment extending over several weeks, but are not confined to bed and require no special nursing. This way of housing patients is popular with them and is less expensive for the hospital than admitting them to ordinary wards. The new X ray therapy department is now available for the treatment of patients although the whole of the apparatus is not yet installed. The four continuously evacuated Metropolitan Vickers tubes are designed to provide the maximum of flexibility with the minimum of controls. The tubes will normally be run at 250 kilovolts, two from each generator, but three or four can be run from one generator so that any tube or either generator can be isolated for cleaning or repair with the least possible disturbance of the treatment schedule. Stabilisation of the kilovoltage and current will be automatic, not, as is usual, under the control of the technician; since there will be an ionisation chamber for each tube the output can be observed easily. The object of this arrangement is to enable the technician to concentrate on the details of treatment rather than on the mechanism of his apparatus, and to allow the physicist to adjust the output for varying field sizes and distances. A continuously evacuated tube operating at 500 kv. is also being constructed for the department by Messrs. Metropolitan Vickers, who hope to be able to design a unit which will operate at this high voltage without much loss of flexibility. Experience in America suggests that for deep-seated lesions the use of high voltage radiation is advantageous, not only because the focal skin distance can be increased to obtain a better depth dose but because the shorter effective wave-length obtained produces less reaction in the skin. The results obtained with this apparatus will be watched with attention by those working at other centres.

[1] Canuyt, G., and Gunsett, *Pr. méd.* 1937, **45**, 1559.

THE NEW YEAR HONOURS

AN honours list is apt to inspire the same feelings as a prize-giving—though the King has not yet gone so far as to preface one with the familiar consolation that "those who receive the honours are not always those who do best in life." Nevertheless it is very pleasant to see recognition—even if it sometimes seems inadequate—of services that are very real, and the list we publish on p. 114 contains many reasons for such pleasure. It is Lord Horder's assistance to the Royal Family that brings his G.C.V.O., but he might just as fittingly receive this high distinction for his public work. General Walker, who becomes K.C.I.E., deserves well of his country and of India, and Dr. F. Barrie Lambert, now D.B.E., has earned her title in several fields, most recently on the L.C.C. Of the new knights bachelor, Prof. R. J. Johnstone has long been well known and well loved as an obstetrician and a representative of medicine, and he is this year's president of the British Medical Association. Dr. C. M. Wilson had a vision of what his medical school, St. Mary's, might become, and has realised that vision by devoted effort. Mr. J. W. Leech, after practising and teaching surgery at the Newcastle Medical School, became Lord Mayor of the city, and has for many years been one of its Members of Parliament. Dr. W. G. Savage, while responsible for the public health of Somerset, has made himself the greatest authority, in this country at least, on the production of safe milk and the elucidation of food-poisoning. Outside the ranks of medicine itself we may note the viscounty bestowed on Lord Nuffield, and the knighthoods for Mr. E. W. Meyerstein, another benefactor of hospitals, and for Mr. D. R. Wilson, chief inspector of factories. Mr. T. F. Sibley gave fine service to the universities of Wales and London before accepting his present post of vice-chancellor at Reading. The list of new officers of the Order of the British Empire includes the names of Miss Louie Brooks, long secretary of the London (R.F.H.) School of Medicine for Women, for services to the Lady Dufferin Fund Association, and Mr. R. H. P. Orde, secretary of the British Hospitals Association.

SPECIAL ARTICLES

CHILD HEALTH IN THE GOLD COAST *

BY CICELY D. WILLIAMS, D.M. Oxon., M.R.C.P.Lond., D.T.M. & H.
COLONIAL MEDICAL SERVICE

THE mortality and morbidity of the children in West Africa, as in most primitive communities, is high. At first sight, few adults appear to be diseased or malnourished, while many of the infants are very pleasing. And yet in every village, and in many towns, the children, especially those of the toddler stage, are so unhealthy as to be conspicuously unshapely. Probably less than 50 per cent. of the babies born alive survive to maturity.

GENERAL ENVIRONMENT

In order to assess the factors that are adverse to health, especially to child health, it is necessary to survey the environment and the habits of the community.

The Gold Coast has an area of some 90,000 square miles. The climate as a rule is damp and warm. The population is over 3,000,000, including about 300,000 immigrants from Liberia and British and French West Africa. The land is not unfertile. There is little poverty. The country produces nearly half the world's total cocoa, while gold, diamonds, and manganese are mined with increasing profit. There is no European ownership of land, so that the wealth of the country is shared by the African population.

The various tribes differ to a certain extent in their habits, food, and mode of living, but the differences are often of ethnological rather than of sociological interest. The main difference is between the Moslem tribes from the north and the pagan or semi-Christian people of Ashanti and the Colony. Each village has its chief, supported by the "stool-elders." The system is partly hereditary, succession being through the females, and partly democratic, the chief being elected from a number of eligibles. Land rents and court fees are supposed to be used for public purposes, sometimes schools and roads, and sometimes for celebrations when gin and gunpowder take the place of *panem et circenses*. Each village owes allegiance to a paramount chief. The larger towns are divided into companies and the system is nominally well organised. Actually there are many squabbles, partly because education is tending to "detribalise" a proportion of the community and partly because native institutions "developing along natural lines" are being invested with increasing and unaccustomed responsibility.

The African male is much addicted to the habit of sitting in the shade and playing *warri*, discussing his prowess, or manufacturing political and litigious situations. He is content to see his womenfolk heavily overworked on his farm or to pay wages to an alien labourer. His interest in the sterile minutiæ of tribal politics is reflected in the large proportion who study law if they go abroad for their education. This preoccupation is now being fortified and supplanted by the intricacies of British litigation.

Many of the people are nomadic by tradition. The men are no longer hunters or warriors. Their interests are not yet sufficiently re-orientated to economic and practical occupations. The fishermen of the coast form some of the most static members of the population. The others wander from farm to village and village to town according to the season, the festivals, and the family requirements.

In spite of the numbers of missionaries and schools, Christianity as yet has made little headway; except for a very few, church-going on a Sunday does not preclude other observances during the week. The Moslems form a small minority, most of the people belonging to the fetishes. The ills to which human flesh is heir are put down to evil spirits, witches, and the instigation of enemies. Personal religion is assisted by all manner of charms and symbols. Ceremonial performances are frequent, noisy, and excitatory; human sacrifice is not unknown. Priests and witches wield great power. Some native "doctors" combine witchcraft with medicines, while others are pure herbalists, and some of their cures are genuine and convincing; they undoubtedly have some effective treatment for tetanus. Their methods are complicated but would repay investigation.

Education is highly prized by the Africans, often in the hope that it may lead to a sedentary occupation. They are attentive and eager pupils. They are ready to absorb masses of information while they rarely attempt to digest it. They rejoice the educationists, while those who have to deal with the finished products of their efforts are not so complacent.

Recreations consist mostly of dancing, singing, drumming, games, and story-telling, and they form an important part of village life. The children take part in it all. Even the babies may be half-choked with dollops of palm wine during a festival. You will see the mothers dancing with the babies on their backs, their poor little heads rolling and nodding in time with the drums. It is no wonder that if they grow up they have an inborn sense of rhythm.

Funeral customs, fetish rites, and lawsuits are the occasions that demand the most lavish celebration. Relations and friends help to finance these to make them a success. Ten guineas was offered to me for a medical certificate for a court case by a woman who, one week before, would not spend sixpence for the treatment of a sick child. In another case the family spent twenty-six pounds on the funeral of a woman who had died in childbirth. There was not one penny left to buy milk for the motherless baby.

Family Life

Polygamy prevails. Each man has as many wives as he can afford. The system has obvious advantages, but the disadvantages lie heaviest on the older children, who are often inadequately protected, on the young woman who may be one of the many wives of an old man, and on the young man who has not the means to buy him a wife suitable to his age and inclinations. It favours rape, promiscuity and prostitution, and the spread of venereal disease.

A wife is an investment. A virgin costs about ten pounds. She works for her husband, cooks his food, cultivates his farm, engages in petty trading, and takes it in turn with the other wives to live with him. When advanced in pregnancy she generally returns to her mother, and often stays there until the child is about a year old. She may go back to her husband, or she may contract an alliance with someone else. It all depends upon the proximity and the solvency of the previous mate. She still looks on her mother and her mother's family as her principal attachment. The children are often sent to family headquarters, either permanently or for long periods. The father of the child has some authority over it but in some cases he is far away or untraceable. The most united families are those that live in the remote villages where life is self-contained and primitive.

THE HOME

In an average household the rooms are built round a compound. The furniture is simple, the rooms being largely used for untidy heaps of boxes, tins, bottles, and clothes; while the beds are simply

* Abbreviated from a thesis for the D.M. Oxford.

mats on the floor. The compound or the verandah round it is used during the day for all household occupations, recreations, and repose. Cooking is done on a small fire or coal pot, meals being prepared by a mammie who squats on the ground or on a low stool. Washing is done and meals are eaten in the same position. Scraps of food that fall to the ground are scrambled for by the children and the domestic animals. Every sort of domestic utensil takes part in the confusion—clean and dirty together, mostly dirty. It is not rare to see a stately negress walking along bearing a few tomatoes, some eggs, and a loaf of bread—all contained in a chamber pot.

In the towns there is a good water-supply and a latrine system, but the innate lack of fastidiousness in all matters of toilet demonstrates the failure of material structures in the face of defective health education. Where water is available, bathing is a routine which is performed with thoroughness and enthusiasm. The babies are well bathed two or three times a day. The clothes are usually clean and well laundered. The children wear no clothes except for the strings of beads and diminutive "tail cloth" worn by the little girls. This nudity renders them very liable to sores and skin infections. The men wear short trunks when working and the graceful and dignified toga during leisure. The women work in petticoats, but in the towns they wear a loose blouse and clothes of gay and varied colours that rejoice the eye. Beads and ear-rings are much studied, and gold ornaments are worn in the hair when it is dressed for ceremonial occasions. At the big festivals the many-coloured umbrellas, dancing and twirling, the gorgeous robes and massive gold ornaments of the chiefs and their followers make an unsurpassable wealth of colour. The Moslem people, though more orderly, are exceedingly dirty in person and in clothes.

In spite of their ablutions the coast Africans do not seem to resent their newly washed clothes or children being soiled with dirt or excrement. A well-born woman will be sitting down when the baby defæcates all over her lap. She will scrape up the stool with her hand and flip it on to the ground, regardless of the domestic utensils and foodstuffs lying about. She then proceeds to wipe her fingers on her cloth, her legs, her chest, with some daintiness.

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The position of women in the household is important, though it is not true that most West African tribes are matriarchal. The women of the pagan tribe are on the whole more intelligent and responsible than the Moslems—most people would say that the reverse is true of the men. Girl babies are always welcomed as they are a commercial asset, and there are no surplus women. As children they work hard at domestic duties—hewers of wood, drawers of water, beaters of *fu-fu*, and guardians of their younger relatives. Later on they may have fits of violent reaction when they may refuse to help in the house and spend all their time in the pursuit of vanities. Puberty is an occasion of great festivity and they are given in marriage soon after. They are never doomed to spinsterhood, and rarely to an unhappy marriage. If one husband ill-treats them they generally run away and find another. There is not necessarily any jealousy between the wives of the same man. Some writers deprecate the "slavery" of the African women. They certainly work hard and even excessively, so that their childbearing is adversely affected, but I do not think they are unhappy because of their work. They are desperately unhappy if they have failed either in producing children [illegible] of their responsibilities.

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The woman's position as a young mother is chic but not responsible. Her mother still orders her about and assumes control of the child management. It is most desirable to be prolific. A large proportion of the children die young. The mother's sorrow is acute and dramatic at the time, but she soon recovers and forgets her troubles. She is anxious to go on having children as, when she has passed the climacteric, she will be demoted from the wife class into the dowager class. Though she is then respected in political circles and powerful in family circles, this is a personal misfortune. At the antenatal clinics pseudocyesis is common. Gallant optimists will pay large fees in the hope that they may have a child. "I have been pregnant for three years. Please give me some medicine to make my abdomen enlarge."

In most states a queen-mother is appointed. They are often wise old women, and are treated with great respect; their funerals are celebrated with pomp, gin, and gunpowder, and are second only to those of the chiefs themselves.

Child Life

The first months of an infant's life are certainly its happiest. It is carried about on its mother's back, a position it loves, it sleeps close beside her, it is nourished whenever it cries, and on the whole it does remarkably well on this treatment. Apart from the considerable proportion of neonatal deaths, some 30 per cent. are chubby, cheerful, and bronchitic. An equal number are normal up to about 9 months and perhaps only 40 per cent. show obvious signs of mismanagement.

A woman has a lot of time in which she likes to sit with a baby. First she washes it slowly, lingeringly. Then she alters the disposal of the beads with great precision and leisure. She powders it or makes patterns on it with "wet-white" made out of clay. Any fractiousness on the part of the baby is met with the same diversion—the breast is thrust into his mouth. The mother has no conception of any other way of amusing or pacifying a child. So far the toilet may be harmless. But then, out of idleness, or excessive advice from grandmothers, an enema may be administered. This is a daily routine in some families. It may be given by directly blowing the enema from the mouth of the administrator into the rectum of the recipient. More frequently a bottle neck gourd is employed. A few of these may be seen hanging up in every compound generally near the cooking place. They are used by all the family; they may contain herbs or some crude disinfectant such as izal. They may cause anything from anal fissure to a severe proctitis, and prolapse. They are a fertile method of spreading gonorrhœa.

Every detail of a small baby's physique is examined and considered. A normal fontanelle is constantly reported as a "hole in the head." A normal vagina is turned into a vaginitis "because it is red." Any irregularity of the colour and texture of the skin is worthy of anxiety and treatment. This meticulous care of the small baby is in striking contrast with the neglect and indifference with which the older children may be treated.

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FIG. 2.—Two small Hausa boys.

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Although the mothers are fond of their children they are quite incredibly careless with them; like all primitive people they are lacking in imagination. The baby may be left to a small girl who drops him. He is left near a fire and is horribly burned before anyone notices his screams. As soon as he becomes mobile he is allowed to crawl all over the compound. He stuffs his mouth with all sorts of dirt and rubbish. When one considers that the compound is full of other children and animals with insanitary habits—not to mention the expectorating adults—the results can be imagined. It is no wonder that the average child of 18 months weighs no more than he did at 9 months, that he is pot-bellied and spindle-legged, peevish, helminthic, and in constant abdominal discomfort. The idea that the "simple savage" has instinctive knowledge in caring for her children is without foundation. She is as foolish as the most sophisticated mondaine and she is less educable.

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Pregnancy is a proud achievement. Instead of concealing it the women are delighted to display a tumid figure. Childbirth is generally supervised by the grandmother. If she suspects trouble she gets in the local medicine man. He encourages the patient with exhortations, dances, clapping, and drugs—some of which he may drink himself—sometimes with vigorous manipulations. Cases of obstructed labour are sometimes admitted with the perineum torn, swollen, and pouring with foul-

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talk down to a child. The children may fight and hit each other in anger, but you seldom see deliberate teasing. If they are well treated they grow sensible and are in some ways in advance of their European contemporaries. But there are some that become oafish and suspicious from unsympathetic handling.

In the evening you may see the children—about ten of them—at their meal. There is one large basin of *fu-fu* (pounded yam or cassava) and a small one of soup. Each one pinches off small pieces from the lump. He gently shapes it with his fingers, dips it in the soup, and puts it in his mouth. He delicately licks his fingers and repeats the operation. The whole proceeding is deliberate and mature; there is no scramble or hurry. But their appetites are generally poor. They are given oddments of food at all hours of the day; there is no keen edge to their hunger and no great efficiency in their digestive powers.

FIG. 3.—Mother three months' pregnant. 1st, 3rd, and 4th children died when they began to walk; 2nd miscarriage, 5th (left) aged 3½ years, weight 18 lb.; yaws, malnutrition, worms, scabies, and malaria. 6th (right) aged 1½ years, weight 17 lb., beginning to show malnutrition. Mother considers them normal.

It sometimes happens that a small child strays into my consulting-room by himself. He may have come from "far bush" and have scarcely seen a white person before and certainly not a white woman, but he marches in, walks straight up, leans his elbow on my knee, and exchanges greetings. "What is the matter?" I ask. "I have fever and a pain in my stomach and I have no appetite" he promptly replies. I ask him to point out the position of the pain. He hitches his small toga from his shoulder and with dramatic gestures he gives the details of his condition. The mother enters at this point, runs forward and clasps the child. "Shegbayeh, shegbayeh!" she exclaims, "he is afraid." But as a matter of fact he is neither shy nor afraid until he is annoyed or hurt. Then he is a terror. The children have no instinctive colour prejudice. Sometimes they endure their own ailments, especially if they are chronic, with a patience and stoicism that is nothing short of ghastly.

Half-caste children are usually well treated. Many of them are named from birth with the prefix of *ora* or *awura*, which is an honourable title. This, however, is not an invariable rule. I have known of some who were grossly neglected.

SUPERSTITION

There are many superstitions, customs, and rites which concern childbearing, some of them charming and harmless, some that are damaging. If several children in a family die, the next one is given a disparaging name, such as "It doesn't matter" or "We laugh at death." The child is put under the protection of a fetish, sacrifices are performed, and the hair is allowed to grow long and the appearance unkempt. In some districts radiating incisions are made on the face. In some tribes twins are unlucky and used to be destroyed. In some a baby that survives its mother is regarded as unlucky. Very few of them live long anyhow.

A baby weighing 3 lb. was brought into a clinic. There were fourteen incisions, each 2 in. long, on the abdomen. I asked the father, a local chief, why he had done it. "It is our custom" he replied. "But," I said, "this child is small and weak. You should not have injured her like this." "But it is our custom. The District Commissioner says we must keep our customs." "If your customs are good, keep them," I told him, "but any custom that will hurt a child is bad and you must stop it. If you must cut your children when they are born, make one small cut and finish. Do not kill your children with your customs." The child died, but he followed the advice with the other babies born in his household.

This illustrates the confusion of mind that exists. The missionaries tell them they are pagans—they must abandon all their former ways if they become Christian. Th[redacted]ed to adopt a nominal monogamy [redacted]g, medallions of John We[redacted]cording to taste, together[redacted]ne of the most difficul[redacted] The political admi[redacted]eir customs, obey[redacted] firmly their tribe[redacted]ese people. But[redacted]nse when it is d[redacted]udgment is und[redacted]

The [redacted] mentality of the Ai[redacted]ls in Africa. Compare[redacted] seems to lack initiative a[redacted]though he may be a shrewd ju[redacted]ients of others. He has a childlike [redacted]distinguishing the sincere from the false, the shepherd from the hireling. He is almost invariably dishonest. He wishes to attain wealth without expending too much energy. He does not consider that there is any obligation to honesty beyond the members of his own family. For them he will give up anything he has and steal anything he has not. Outsiders are fair game and are treated with the utmost callousness. He is conventional and loves talking. He will invent all manner of fabricated excuses out of politeness combined with a facile verbosity. Power of observation is astonishingly defective. Cardinall (1931) quotes the instance of "I saw the woman turn into a hyena," whereas you or I would see that the woman did not turn into a hyena. "Their surprising ignorance of nature lore" (Crocker) and their witchbound convictions are the resultant. They are good in an emergency if it is the type of situation to which they are accustomed—otherwise they lose their heads. They seem to be incapable of sustained effort.

The African child suffers from various psychological difficulties. A baby that is indulged unceasingly by its mother has not had the best introduction to life. Weaning is often a time of profound shock. Neurasthenia among older children is common—especially among the school-children. Girls tend to complain of headaches and malaise, especially during menstruation. But life makes little demand on the mentality in the village. These aberrations will have to be considered seriously when education is better organised, to enable the African to take any high place in the economy of nations.

An African has little imagination and little humility. His self-esteem is often ludicrous. And yet he is willing to shelter behind "You can't expect better from a poor African." As long as the courts deal leniently with false statements, the administrators with dishonesty and incompetence, as long as the "humanitarians" go on handing out ill-considered bouquets to mediocre performers, so long will Africa have a real cause for complaining of her treatment at the hands of the "civilised" community.

As a matter of fact, it is impossible at present to assess the capabilities of a race that suffers from so many physical and psychological hazards. Some of the intellectual qualities of the African that delay his progress, lack of initiative, the servile acceptance of superstitions and customs, many of them fantastic and damaging, his propensity to prevaricate and to defraud, may be ascribed in part to some dietetic imbalance, and some to imbalance of upbringing.

FIG. 4.—The central child was born in Kumasi, and attended a weighing centre where advice was given about diet and prevention of disease. The two others came from distant villages where they had been brought up on the ordinary native diet.

It is certain that many children come into the hospital intensely peevish and/or lacking in initiative to the point of katalepsy and leave it at the end of a few months on a good diet boisterous and responsive as a normal child. Those qualities of docility and tractability, so vaunted by the educationists, will, I hope, be largely modified in future.

I have seen enough of the excellent qualities of the Africans—their good nature and cheerfulness, their astuteness, their uncomplaining fidelity, their patience in very great trials—to know that they are worth educating. The qualities most in need of education are observation, imagination, and judgment. There is much too that can be learned by those Europeans who are fortunate enough to spend much time with them. To the transient white man the African is a worthless baboon. To the static neighbour he is a good friend. When we have learned more from the African mentality I believe we shall be nearer achieving that most difficult objective—discipline without frustration.

Diseases

The diseases from which the children suffer are exactly those that might be expected from the mise-en-scène.

Malnutrition is the most serious problem. The diet mainly consists of bulky carbohydrates and lacks proteins and animal fats. Mineral deficiencies may prove to be considerable. In spite of profound degrees of malnutrition, the orthodox deficiency diseases are rare. A condition known as *kwashiorkor* is found among the children under 5 (Williams 1935). Improved knowledge of nutrition is, I believe, one of the supremely important factors for progress. Malnutrition kills off many of the children and it reduces the stamina of the adults so that they fall easy victims to pneumonia, tuberculosis, &c. Improved nutrition will do more to raise the standard of health and of living than any amount of medication, isolation mania, sanitary plumbing, prenatal mensuration, and operating-theatrical measures.

Malaria is very prevalent. It is most damaging to children between 3 months and 3 years of age. If the child survives—with or without treatment—some immunity is acquired. Most adults live in symbiosis with their parasites and only suffer from attacks of fever if they are overworked, chilled, or malnourished.

Intestinal diseases, gastro-enteritis and the dysenteries, cause a vast mortality and morbidity. Their incidence can be much reduced by health education. Helminthiasis, especially ascariasis, is equally common and equally damaging to the children. Their intestines are so irritated by worms, inflamed by enteritis, excoriated by pepper and by purgatives, assaulted by enemata, damaged by past diseases, and distended with coarse, bulky carbohydrate food, that they altogether lose the power of assimilating the evasive nutrition of their contents.

Yaws is very prevalent in the "bush." It is becoming rare in the towns where injections can be obtained cheaply and regularly. I believe it will yet be proved that yaws is responsible for many stillbirths and neonatal deaths. Ulcers and skin diseases proceed from malnutrition, dirt, and infections; they are essentially preventable.

Pulmonary complaints form the largest "causes of deaths" in the annual reports. In most cases pneumonia is the terminal condition in malnutrition, helminthiasis, enteritis, &c., and is a symptom rather than a cause of death. Obstetric deaths and morbidity are considerable. They will not be reduced by very much until it is realised that domestic is just as important as pelvic economy. Gonorrhœa is common and is responsible for a great deal of sterility.

Some conditions are remarkable for their rarity. Among these are surgical conditions such as appendicitis and osteomyelitis, acute rheumatism, carcinoma of the breast or uterus, and allergic conditions. More research on the ecology of disease would lead to great advances in knowledge.

Conclusion

Colonial government aims at the amelioration of life for the indigenous and the increase of general prosperity. Many claim that the "simple savage" is happier if his condition is left unchanged. This is very possibly true, but no force on earth can prevent civilisation from spreading its tendrils. The most that colonial government can do is to prevent exploitation by pruning the predatory tendrils and by encouraging the growth of those that seem beneficial. There is nothing that civilisation has to offer which is better than the welfare of children.

Over-population is a bogy to numbers of theorists. It is not likely to become a practical menace. Improved living conditions mean improved self-respect. This is not a quality that leads to reckless propagation. The best educated countries are those with a small birth-rate.

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1. The greater part of the ill health is preventable.
2. The care of children in the toddler stage is of supreme importance.
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talk down to a child. The children may fight and hit each other in anger, but you seldom see deliberate teasing. If they are well treated they grow sensible and are in some ways in advance of their European contemporaries. But there are some that become oafish and suspicious from unsympathetic handling.

In the evening you may see the children—about ten of them—at their meal. There is one large basin of *fu-fu* (pounded yam or cassava) and a small one of soup. Each one pinches off small pieces from the lump. He gently shapes it with his fingers, dips it in the soup, and puts it in his mouth. He delicately licks his fingers and repeats the operation. The whole proceeding is deliberate and mature; there is no scramble or hurry. But their appetites are generally poor. They are given oddments of food at all hours of the day; there is no keen edge to their hunger and no great efficiency in their digestive powers.

FIG. 3.—Mother three months' pregnant. 1st, 3rd, and 4th children died when they began to walk; 2nd miscarriage, 5th (left) aged 3½ years, weight 18 lb.; yaws, malnutrition, worms, scabies, and malaria. 6th (right) aged 1½ years, weight 17 lb., beginning to show malnutrition. Mother considers them normal.

It sometimes happens that a small child strays into my consulting-room by himself. He may have come from "far bush" and have scarcely seen a white person before and certainly not a white woman, but he marches in, walks straight up, leans his elbow on my knee, and exchanges greetings. "What is the matter?" I ask. "I have fever and a pain in my stomach and I have no appetite" he promptly replies. I ask him to point out the position of the pain. He hitches his small toga from his shoulder and with dramatic gestures he gives the details of his condition. The mother enters at this point, runs forward and clasps the child. "Shegbayeh, shegbayeh!" she exclaims, "he is afraid." But as a matter of fact he is neither shy nor afraid until he is annoyed or hurt. Then he is a terror. The children have no instinctive colour prejudice. Sometimes they endure their own ailments, especially if they are chronic, with a patience and stoicism that is nothing short of ghastly.

Half-caste children are usually well treated. Many of them are named from birth with the prefix of *ora* or *awura*, which is an honourable title. This, however, is not an invariable rule. I have known of some who were grossly neglected.

SUPERSTITION

There are many superstitions, customs, and rites which concern childbearing, some of them charming and harmless, some that are damaging. If several children in a family die, the next one is given a disparaging name, such as "It doesn't matter" or "We laugh at death." The child is put under the protection of a fetish, sacrifices are performed, and the hair is allowed to grow long and the appearance unkempt. In some districts radiating incisions are made on the face. In some tribes twins are unlucky and used to be destroyed. In some a baby that survives its mother is regarded as unlucky. Very few of them live long anyhow.

A baby weighing 3 lb. was brought into a clinic. There were fourteen incisions, each 2 in. long, on the abdomen. I asked the father, a local chief, why he had done it. "It is our custom" he replied. "But," I said, "this child is small and weak. You should not have injured her like this." "But it is our custom. The District Commissioner says we must keep our customs." "If your customs are good, keep them," I told him, "but any custom that will hurt a child is bad and you must stop it. If you must cut your children when they are born, make one small cut and finish. Do not kill your children with your customs." The child died, but he followed the advice with the other babies born in his household.

This illustrates the confusion of mind that exists. The missionaries tell them they are pagans—they must abandon all their former ways if they become Christian. The converts proceed to adopt a nominal monogamy, clothes, church-going, medallions of John Wesley or the Sacred Heart according to taste, together with the asseveration of some of the most difficult points in Christian theology. The political administration tells them to keep their customs, obey their chiefs, and establish more firmly their tribal traditions. Life is difficult for these people. But they have a great deal of common sense when it is demanded of them. Their power of judgment is undernourished and lacks exercise.

Mental Characteristics

There are as many opinions on the mentality of the African as there are individuals in Africa. Compared with the white races he seems to lack initiative and constructive ideas, although he may be a shrewd judge of the attainments of others. He has a childlike gift for distinguishing the sincere from the false, the shepherd from the hireling. He is almost invariably dishonest. He wishes to attain wealth without expending too much energy. He does not consider that there is any obligation to honesty beyond the members of his own family. For them he will give up anything he has and steal anything he has not. Outsiders are fair game and are treated with the utmost callousness. He is conventional and loves talking. He will invent all manner of fabricated excuses out of politeness combined with a facile verbosity. Power of observation is astonishingly defective. Cardinall (1931) quotes the instance of "I saw the woman turn into a hyena," whereas you or I would see that the woman did not turn into a hyena. "Their surprising ignorance of nature lore" (Crocker) and their witchbound convictions are the resultant. They are good in an emergency if it is the type of situation to which they are accustomed—otherwise they lose their heads. They seem to be incapable of sustained effort.

The African child suffers from various psychological difficulties. A baby that is indulged unceasingly by its mother has not had the best introduction to life. Weaning is often a time of profound shock. Neurasthenia among older children is common—especially among the school-children. Girls tend to complain of headaches and malaise, especially during menstruation. But life makes little demand on the mentality in the village. These aberrations will have to be considered seriously when education is better organised, to enable the African to take any high place in the economy of nations.

An African has little imagination and little humility. His self-esteem is often ludicrous. And yet he is willing to shelter behind "You can't expect better from a poor African." As long as the courts deal leniently with false statements, the administrators with dishonesty and incompetence, as long as the "humanitarians" go on handing out ill-considered bouquets to mediocre performers, so long will Africa have a real cause for complaining of her treatment at the hands of the "civilised" community.

As a matter of fact, it is impossible at present to assess the capabilities of a race that suffers from so many physical and psychological hazards. Some of the intellectual qualities of the African that delay his progress, lack of initiative, the servile acceptance of superstitions and customs, many of them fantastic and damaging, his propensity to prevaricate and to defraud, may be ascribed in part to some dietetic imbalance, and some to imbalance of upbringing.

FIG. 4.—The central child was born in Kumasi, and attended a weighing centre where advice was given about diet and prevention of disease. The two others came from distant villages where they had been brought up on the ordinary native diet.

It is certain that many children come into the hospital intensely peevish and/or lacking in initiative to the point of katalepsy and leave it at the end of a few months on a good diet boisterous and responsive as a normal child. Those qualities of docility and tractability, so vaunted by the educationists, will, I hope, be largely modified in future.

I have seen enough of the excellent qualities of the Africans—their good nature and cheerfulness, their astuteness, their uncomplaining fidelity, their patience in very great trials—to know that they are worth educating. The qualities most in need of education are observation, imagination, and judgment. There is much too that can be learned by those Europeans who are fortunate enough to spend much time with them. To the transient white man the African is a worthless baboon. To the static neighbour he is a good friend. When we have learned more from the African mentality I believe we shall be nearer achieving that most difficult objective—discipline without frustration.

Diseases

The diseases from which the children suffer are exactly those that might be expected from the mise-en-scène.

Malnutrition is the most serious problem. The diet mainly consists of bulky carbohydrates and lacks proteins and animal fats. Mineral deficiencies may prove to be considerable. In spite of profound degrees of malnutrition, the orthodox deficiency diseases are rare. A condition known as *kwashiorkor* is found among the children under 5 (Williams 1935). Improved knowledge of nutrition is, I believe, one of the supremely important factors for progress. Malnutrition kills off many of the children and it reduces the stamina of the adults so that they fall easy victims to pneumonia, tuberculosis, &c. Improved nutrition will do more to raise the standard of health and of living than any amount of medication, isolation mania, sanitary plumbing, prenatal mensuration, and operating-theatrical measures.

Malaria is very prevalent. It is most damaging to children between 3 months and 3 years of age. If the child survives—with or without treatment—some immunity is acquired. Most adults live in symbiosis with their parasites and only suffer from attacks of fever if they are overworked, chilled, or malnourished.

Intestinal diseases, gastro-enteritis and the dysenteries, cause a vast mortality and morbidity. Their incidence can be much reduced by health education. Helminthiasis, especially ascariasis, is equally common and equally damaging to the children. Their intestines are so irritated by worms, inflamed by enteritis, excoriated by pepper and by purgatives, assaulted by enemata, damaged by past diseases, and distended with coarse, bulky carbohydrate food, that they altogether lose the power of assimilating the evasive nutrition of their contents.

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5. Preventive work must go hand in hand with curative in order to obtain the confidence of the people, adequate care of individual children, and the efficiency of the health workers and the medical services as a whole.

6. Maternity and gynæcological work are needed. By themselves they are of limited value. In spite of their popularity they should not be allowed to overshadow the importance of the other aspects of welfare work.

7. Coöperation with the agricultural, the animal health, the education departments, and with the political administration is necessary to teach the population what to grow, how to prepare it, and how to spend their money and conduct their families with the greatest contentment.

In order to illustrate this type of work the figures from Kumasi (population 30,000) may be quoted. I take no credit for this work, as I was only in Kumasi for 17 months. The clinic contained 25 beds for sick children and maternity cases. The staff consisted of 1 woman doctor, 1 European sister, 1 European trained health visitor, 2 African untrained health visitors, 2 African trained nurses, 9 African nurses in training, 3 African trained midwives, dispenser, clerk, cook, washerman, and 3 labourers. During 1935 some 800 cases were treated as in-patients—major operation cases had to be transferred to the general hospital. There were over 17,000 attendances of sick children and 11,000 of antenatals—only 25 per cent. of these attendances came from the town itself. In the eight weighing centres in the town there were 35,000 attendances. These centres were conducted by health visitors and nurses. Sick children from the centres were referred to the doctor at the clinic. Those who were diligent in following the advice about diet, play-pens, mosquito nets, and child management in general were charged nominal fees for medicine. The reverse would be penalised, or threatened with financial extortion. It was found that a small fee in most cases was a good therapeutic measure, though of course there were exceptions. Over £1000 was paid into the treasury in fees. Mothers and other members of the family stayed in the hospital with those admitted and thus had constant demonstration in nutrition and child management. The nurses in training were learning preventive work in the weighing centres at the same time as their curative work in the clinic.

The "survival of the fittest" has become a clumsy and incompetent cliché. It has practical value only as long as man has purely animal ambitions. The fact that a child survives an attack of pneumonia at three years old does not mean that he will be any better as a labourer or as a lawyer. It does not even necessarily mean that he is more fit to survive another attack of pneumonia. Conditions that kill the weaklings are also conditions that may make weaklings of the strong. The resiliency of nature is such that if a weakly child is assisted over the difficult and stressful years of growth he may become just as robust as the child that flourishes consistently. Hardship is of only limited value as a trainer of body and mind. A body cannot develop strength if it is starved of proper nourishment. Character and mentality can only develop originality and detachment when purely somatic needs are not importunate.

Nature uncontrolled is no more considerate than an earthquake in eliminating the unfit. It would seem to be more desirable to try to ensure that those who survive shall be fit.

I have to thank the Director of Medical Services, Malaya, for permission to publish this article.

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MEDICINE AND THE LAW

Privy Council Decision on Use of Radiography

THE judicial committee of the Privy Council delivered an interesting judgment on Dec. 21st in Sabapathi *v.* Huntley, an appeal from Ceylon which in part turned upon the medical practitioner's duty to advise a radiographic examination. Mr. and Mrs. Huntley met with a serious motoring accident and were taken by car to the Karanawella Hospital. The car stopped first at the bungalow of Dr. Sabapathi, the district medical officer, which is close to the hospital. He was informed of the circumstances, directed the party to proceed to the hospital, and visited the patients there soon afterwards. Next day he paid morning and afternoon visits, in compliance with a rule obliging him to visit each patient in a paying ward twice a day. On the second morning after the accident Mr. and Mrs. Huntley were driven home. Two days later Mr. Huntley wrote a letter to Dr. Sabapathi, briefly asking for his hospital bill soon "as we sail so early," and adding "we are both very much better and grateful for the way in which we were looked after at Karanawella." After a few more days Mr. and Mrs. Huntley, being in Colombo, arranged to see Dr. De Silva, a specialist, who advised an X ray examination which disclosed fractures. The patients went into the Fraser Nursing Home and remained 45 days under Dr. De Silva's treatment. While in the home Mr. Huntley wrote to the director of medical and sanitary services at Colombo a letter making what he called "a very strong complaint against the negligence and incompetence of the district medical officer at Karanawella." He said that, on their arrival at the hospital on the night of the accident, the district medical officer "after a very perfunctory examination pronounced definitely that no bones were broken, and, without any suggestion whatever of an X ray examination in Colombo, put us in charge of the acting matron in the paying ward and actually intimated that we might leave on the following morning." The letter went on to describe the subsequent consultation with Dr. De Silva and the radiograms which disclosed that Mrs. Huntley had a fractured arm and pelvis, while the writer was found to have a fracture below the shoulder. The letter vigorously condemned Dr. Sabapathi's failure to examine or take proper interest in his patients, and called for strong action. Mr. Huntley, without giving Dr. Sabapathi any chance to explain or justify his conduct, sent a copy of this letter to the chairman of the Kelani Planters' Association. The association discussed it at one of its meetings and passed a resolution endorsing its terms. The letter, discussion, and resolution were published in several Ceylon newspapers. Meanwhile Dr. Briercliffe, the director of medical and sanitary services, had referred the letter to Dr. De Silva for report. Dr. Briercliffe eventually sent the Planters' Association a reply to the effect that Dr. De Silva reported that the underlying injuries had been incapable of definite diagnosis without X ray examination. Dr. Briercliffe went on to say that Dr. Sabapathi regarded Mr. Huntley's letter as libellous and that he himself thought the allegations of gross neglect and carelessness could not be substantiated. If a suitable apology were made to Dr. Sabapathi, Dr. Briercliffe would advise Government not to allow Dr. Sabapathi to resort to legal action. Dr. Briercliffe referred to the fact that Mr. Huntley's letter had alleged other cases of complaint against Dr. Sabapathi; he asked

that these or similar cases be brought to the notice of Dr. Sabapathi's official superior. About a fortnight afterwards Mr. Huntley interviewed Dr. Briercliffe and stated that Dr. Sabapathi on the night of the accident had examined Mr. and Mrs. Huntley while still in the car on the way to the hospital, and that the examination in each case lasted only half a minute or so. On these statements Dr. Sabapathi brought an action for slander against Mr. Huntley; on the copy of the letter sent to the Planters' Association he brought an action for libel. The district judge gave judgment for the plaintiff, accepting the evidence of Dr. Sabapathi and his witnesses and rejecting that of Mr. Huntley and his witnesses. He held that the plea of justification failed and that the letter to the Planters' Association was not privileged; if, however, it was to be deemed a privileged occasion, then he held that the defendant was actuated by malice in making the communication. On appeal the Supreme Court of Ceylon reversed the decision, holding that the plea of justification had been made out and that, while the letter to the Planters' Association was not made on a privileged occasion, the communication was not maliciously made. The Privy Council has now restored the judgment of the district judge. It holds that the views of the district judge, who saw and heard all the witnesses, should not lightly be disturbed and that the complaints of incompetence and negligence are antecedently improbable. It was in evidence that members of the Planters' Association were not slow to make complaints of medical inattention on the smallest provocation. It was unlikely that the plaintiff and his witnesses had conspired to commit perjury. It was not till his interview with Dr. Briercliffe that Mr. Huntley complained of Dr. Sabapathi having made no examination in the hospital ward. As to the plaintiff having said that no bones were broken, it was significant that the contemporaneous record of the bed-tickets showed not "no fractures" but "no signs of fracture"—an important difference.

Dealing with the medical aspect of the case, the Privy Council said that the pivotal charge made by Mr. Huntley against the doctor was the failure to recommend the patients to undergo X ray examination. The Supreme Court of Ceylon seemed to adopt the defendant's contention here—namely, that after a motor accident, the attending physician must advise resort to a radiologist, and, if he omits to do so, he displays both incompetence and negligence. The Privy Council observes that this proposition is too wide.

> "An X ray examination must always be a question of circumstances—depending, for example, on the condition of the patient, the character of the injuries and the accessibility of the apparatus."

Dr. Sabapathi had allowed the patients to go home, instructing them to let him know how they progressed. Had their pain and other symptoms continued a week afterwards he would no doubt have advised an X ray examination. But Mr. Huntley's first letter had declared them to be much better. Dr. Sabapathi could not be blamed if, assuming the worst to be past and that Mr. and Mrs. Huntley were sailing for Europe, he thought no more of the matter. The Privy Council remarked that no witness had been called by the defendant to affirm that a delay for a week, to await developments, before advising an X ray examination, rather than advising such an examination at once, would per se constitute negligence or incompetence on the part of a physician.

This judgment by the highest tribunal should presumably be regarded in the light of conditions overseas where, in the circumstances of the particular case, the local hospital equipment was presumably imperfect. It would be unsafe to apply it to conditions in England where the resources of radiology are likely to be available at no great distance. The element of availability is brought out in many of the American cases cited in "The Roentgenologist in Court," reviewed in THE LANCET of Dec. 11th (p. 1382). In America several State courts have dealt with issues of negligence ranging from failure to use X ray apparatus to failure to have the apparatus available. The author observes that a physician in or near a city where X ray facilities exist is more likely to be considered negligent for not using them than another physician with an isolated country practice. In any case a physician armed with a radiogram is in a much better position to defend himself than one who must rely on less certain evidence.

The Bar and the Coroner's Qualification

The annual report of the General Council of the Bar mentions that the Council has lost no opportunity of pressing the view that a legal qualification is essential for the office of coroner. For some years after the amending Act of 1926, it continues, the London County Council required the dual qualification (legal and medical) from candidates for its coronerships; the report of the Departmental Committee in 1936 recommended that the qualification should in future be legal only, though, wherever possible, the appointee should have had experience as deputy coroner and should have a knowledge of forensic medicine; last year the L.C.C. resolved that in future only barristers and solicitors would be eligible for appointment as coroners in London. In this statement of the position the Bar Council seems not to be emphasising what was previously understood to be its attitude—namely, not only that the legal qualification should be essential but that any additional qualification in medicine should be discouraged.

The 1926 Act was the first to insist upon any professional qualification at all. A statute of 1354 declared that the county coroner should be chosen from the most meet and lawful people (*de plus covenables et plus loialx gentz*) in the county. This stood till the Consolidating Act of 1887, along with the ancient requirement (which survived till 1926) that a county coroner should have land in fee in the county. The last edition (1927) of Jervis on Coroners stated that out of some 340 coroners in England and Wales 300 were lawyers, 30 were medical men, and the remainder were chiefly medical men who were also lawyers. The figures given in the Departmental Committee's report in 1936 were 268 barristers or solicitors, 37 medical practitioners, and 4 without any professional qualifications; a few of those classed as barristers or solicitors also, according to the report, possessed medical qualifications. The Bar Council, it will be seen, wants the law changed in order to exclude the medical qualification. The London County Council, disregarding any element of *ultra vires*, is acting as though the law was already changed. The public at large may still agree with the view expressed by the editor of Jervis that, although some knowledge of medical terms and the principles of criminal law is necessary for the proper discharge of a coroner's duties, the chief requisites are the possession of tact, sound discretion, practical sense, sympathy, quick perception, and a knowledge of human nature.

A HOSPITAL NEAR TERUEL

WE have already published two letters describing the work of the British ambulance unit of the Spanish Medical Aid Committee. The following are extracts from letters sent to a friend by Dr. R. S. Saxton, who is in charge of a hospital on the Aragon front near Teruel.

"We are having on the whole a much stiffer time than last winter. The cold has been more severe, and we have continual bursts of rain and very little sunshine. Also there is the constant strain and racket of the enemy air-raids and bombings which sometimes badly affect the morale and nerves of the staff. I am director of one of our latest hospitals—since we came to Spain the Spanish Medical Aid Committee have organised over 40 on the different fronts.

"When we first arrived at our present and now certainly not dismally unpromising quarters everything seemed to be in inextricable muddle. But somehow our personnel sorted itself out with a magic rapidity and in a few hours some sort of practical working routine was achieved. One team of nurses prepared two operating theatres, and the steriliser was alongside with his autoclaves. Another team had rigged up two decent, neat wards to accommodate a hundred patients. The electrician had been hard at work, and much spade work—in every sense—had been accomplished as well in the way of air-raid refuges, refuse pits, and some attempt at making up the roads, in our immediate vicinity at least. I myself secured a moment to install my blood transfusion instruments, in a curtained-off section. The dentist and the oculist seized the most suitable corners available for their activities. Last, but certainly not least, the cook and his helpers were unloading and arranging themselves and their stuff where best they could be planted down.

"Everybody has put his shoulder to the wheel with marvellous energy and good humour. But all the same, the staff is having a pretty grim time. We sleep on floors, rough barrack room boards. The food consists largely of beans, macaroni, and oil. We have not yet been able to do much in the way of adequate water-supplies and sanitation, and have been up against influenza and other epidemics. Thanks however to the fine team-work, patience, and courage of everyone concerned, we have risen fairly triumphant over our difficulties. I have managed to set up a small canteen in the hospital, which makes for social cheeriness, an essential asset. Patients as well as staff can obtain there some of the serious necessaries and small comforts such as shirts, eau-de-Cologne, needles, flash torches, cigarettes, and whatever light refreshments we can rake together. There is a great dearth of cigarettes—we could well do with a few thousands to have on sale. The canteen is bringing in about 1000 pesetas per month; not much, but still I am glad to have it in hand when there is a call for some urgent hospital requisite.

"Since we so often have to make a hasty evacuation one of our main drawbacks is a shortage of transport. At best we have to pack up in a hurry with nothing like enough packing space at our disposal. This often means tragic destruction to our valuable instruments, shaken about on villainous roads. My own precious typewriter has come in for considerable battering, but fortunately so far only the case has been damaged.

"I am very disappointed to have to curtail to a great extent my work on blood transfusion,[1] more especially as I was just then on the track of some of the newest developments in Russia, and I was once more in contact with the able assistant I had out here last summer who is as keen on the work as I am myself. The material required for these new experiments is costly, which makes progress slow. Before I took on this new work that obliged me to put the experiments aside we had already acquired a deceased ambulance, which we converted into a large travelling laboratory where I can collect and analyse my material bit by bit, as occasion and funds allow."

[1] See *Lancet*, 1937, **2**, 606.

BUCHAREST

(FROM OUR OWN CORRESPONDENT)

A QUESTION OF RACE

THE Association of Rumanian Christian Physicians resolved at its recent meeting to demand that in the future public health law the Rumanian Christian characteristics shall be clearly defined, in order that vacant medical positions shall be filled only by racially pure Rumanians. A deputation called on the Minister of Health requesting that in filling the five vacant positions in Bucharest and the chief posts in venereal dispensaries, the racial principles shall be given full consideration. The association appointed a statistical study committee, which will collect data about the positions of ethnical Rumanian physicians in private and State institutions.

PURITY OF RACES

Some of the most eminent anthropologists of the world attended the Seventeenth International Anthropological Congress held recently at Bucharest. The greatest interest was aroused by the statements made by Eugene Pittard, professor in the University of Geneva, whose chief work on races in history clearly demonstrates that theories about the purity of certain races are untenable. At the congress he said that there is a great injustice to science when racial theory is applied to political and social life. The world war was caused not so much by economic necessity as by an exaggeration of the racial theory. A powerful European nation was misled by its leaders who inoculated into their brains the false idea that they belong to a pure race having a great mission. The Aryanism that is now going forward with great parade in that land, he went on, originates in the same delusion and may lead to the same results. This conception of a pure Aryan race is ideological and has no anthropological basis. It merely encourages racial hatred to state that nations can be divided into "select" and "first rate" groups. The history of the world shows again and again the rise and fall of a people who once reached the acme of civilisation. Every anthropologist knows, continued Prof. Pittard in a private interview, that the white peoples are not of a higher order and are by no means necessarily called to rule and to boast of the achievements of their civilisation. Innumerable proud civilisations have disappeared one after the other. Sham science confounds language with race; there is no pure Latin race, just as there is no pure German race. Between the Bavarian and the Pomeranian Germans there is as much difference of temperament and tradition as between the Mediterranean and Nordic nations. There are a few races free from any mixture with other blood. This is only because nobody has yet taken the trouble to disturb them. If, say, oilfields were found on their territory, surely "civilisation" would already have taken pains to annihilate them. Anywhere a strange race sets its feet blending of blood takes place.

Prof. Henry Berr, another prominent anthropologist, told us that there is no race that has not absorbed the most diverse ethnical elements. The

Saxons that are making a show of their Aryan purity have amalgamated with Celt and Slav elements. Civilisation is the better, and has greater creative power, because there is just this diversity in its building up. An instructive example of this is the ancient aristocratic families, where mixing was difficult on account of class prejudices, and therefore they always showed signs of degeneration. The mingling of races, as much as the economic, commercial, and mental links, has contributed to the spreading of universal culture, and cannot therefore be regarded as a disaster.

SULPHANILAMIDE IN GONORRHŒA

In the experience of Dr. Joan Máté, director of the venereal dispensary in Oradea, sulphanilamide has proved effective in simple and complicated gonorrhœa as well as in other urinary infections. In simple cases he administered this drug in the form of instillations in support of the internal treatment. This he did by diluting the injection fluid at the rate of 1 : 2 or 3, and this method also proved beneficial. Though he does not claim that it cures gonorrhœa as promptly as the Americans allege, yet he is very satisfied with its action, since in a quarter of the cases there was complete cure, without any local treatment, while in many others it produced a smooth resolution of the affection. He administers a tablet three times a day, and only exceptionally does he exceed this dose, the maximum being six tablets a day.

UNITED STATES OF AMERICA

(FROM OUR OWN CORRESPONDENTS)

THE POPULATION OF THE UNITED STATES

THE Bureau of the Census has released an intercensal estimate of the probable population of the country as of July 1st, 1937. This stands at 129,257,000, or an increase of 828,000 over 1936, and 6,482,000 over 1930 (the census year). This represents a relatively small percentage increase over the preceding year (0·64) and an increase of 5·28 per cent. in the seven years since the census was taken. Slowing in the rate of increase, at least for the preceding few years, is manifest.

INFANCY AND CHILDBIRTH AMONG NEGROES

A report by Elizabeth Tandy from the children's bureau of the Department of Labor shows that more than 250,000 negro infants are born alive each year in the United States, about two-thirds of them in the rural areas of the south. In every section the mortality-rate is greatly in excess of that for white infants; furthermore the death-rates are, on the whole, higher in urban than in rural areas. Next to natal and prenatal causes, the most common causes of death are respiratory diseases, gastro-intestinal diseases, and epidemic and communicable diseases. The total rate, however, has decreased greatly in the last twenty years, most of the decrease being between the second and the twelfth month of life. Maternal mortality among the negroes is also far more common than among white women. In fact in several of the States the rate from puerperal causes for negro mothers is more than double that for white mothers. The downward trends in the mortality-rates for mothers and infants are probably due largely to the gradual adaptation of the negro to his environment and to the increasing healthiness of the communities in which he lives.

PNEUMONIA MORTALITY

According to the experience of the last six years, the chance of a given death being due to pneumonia is approximately 1 in 14. When the deaths from this cause are combined with those caused by influenza, the total ranks close to second place as a cause of death in the United States. McGill has recently reviewed the death-rate in various parts of the country and attempted to correlate these with the facilities for typing pneumococci and for giving specific serum. This problem is important since it is estimated that there are approximately 175,000 cases and 38,000 deaths annually from pneumonia due to pneumococcus of Type 1 or 2, for which specific sera are available. Several States have definite pneumonia control programmes, but in general the facilities for pneumococcus typing and the actual utilisation of these facilities is not as great as is desirable. It is hoped that the high death-rate from pneumonia can be reduced by more active measures of typing and specific serum administration.

EPIDEMIC DIARRHŒA OF THE NEW-BORN

Headlines in the daily papers of late have been much occupied with a small epidemic of diarrhœa among new-born babies in Chicago. The subject is one, however, of much graver concern than this particular outbreak might imply. It has troubled public health authorities and pædiatricians in New York City as well as in Chicago and other cities for the last three years.

In October two of New York City's epidemiologists, Dr. Samuel Frant and Dr. Harold Abramson, presented to the convention of the American Public Health Association tables and charts derived from the city's morbidity and mortality data for the last ten years as well as the results from a special study of the post-natal course of 4594 live-born babies. The first recognised outbreak of this very fatal intestinal infection was in the summer of 1934, and since then Frant and Abramson have observed 23 such outbreaks in 15 hospitals. A description of the disease written in collaboration with New York's Health Commissioner Dr. John L. Rice and Dr. W. H. Best appeared in the *Journal of the American Medical Association* of August 14th. The January issue of the *American Journal of Public Health* will contain the epidemiological study together with table and charts. The latter indicate that whereas deaths from diarrhœa in the age-group 1 month to 1 year have consistently declined during the last ten years, there has been no such decline in the mortality from diarrhœa in the first month of life. Since 1931 the death-rate from diarrhœa among the new-born had indeed been rapidly increasing.

In New York City 711 cases of the disease are known to have occurred since 1934, of which 335 (47 per cent.) were fatal. The disease has so far been recognised in ten cities on the North American continent. It has also been reported from Edinburgh in Scotland and from Garches in France.

ANATOMICAL CRITERIA OF DEFICIENCY DISEASES

The American Chemical Society gave another indication of the breadth of its interests when it invited Dr. Gilbert Dalldorf, pathologist and director of the laboratories of the Grasslands Hospital, to take part in a symposium on the vitamins at a meeting in New York City on Dec. 11th. Dr. Dalldorf told them that pathologists had recognised deficiency disease long before the discovery of the vitamins. The pioneers, however, had been handicapped by the facts (1) that in man deficiencies are usually complex,

and (2) that the fatal outcome is almost always due to a complicating acute infectious disease. Discovery of the vitamins has made possible an application of the experimental method and in several instances the pathology of vitamin deficiency has now been resolved into fundamental specific effects on certain tissues.

Vitamin A was at first thought to be anti-infectious but closer observation shows that the deficiency lesion is a change in epithelium. The deficiency can be determined, probably as soon as stored vitamin A is depleted, by examination of vaginal epithelium cells removed with a swab. The observed infections are secondary to epithelial change. Irritation will produce metaplasia if the vitamin-A intake is low, and so will theelin (œstrin); but neither will do so if the diet is ample. Epithelial metaplasia is the specific effect of vitamin-A deficiency. The old observations of the association of metaplasia and night-blindness with liver disease now have a new meaning.

The group of vitamin-B factors Dr. Dalldorf described as a Waterloo of pathologists. He did point, however, to a lesion of the bowel, described fifty years ago as colitis cystica superficialis, as being the product of a vitamin-B deficiency.

Vitamin-C deficiency again has a clear pathological picture presenting a change in the nature of the intercellular material of the skeletal tissues. In deficiency these materials remain fluid; within 24 hours of the administration of vitamin C they solidify. The value of vitamin A as a biological tool in the study of epithelium is matched by the possibilities in the use of vitamin C in studies of intercellular materials.

THE LENGTH OF LIFE

Even within the relatively short period covered by available records changes in life expectancy in this country have been remarkable. Dorn (*Publ. Hlth Rep., Wash.* Dec. 3rd, 1937) states that in 1930 the expectation of life at birth was 59 years for white males and 63 for white females in comparison with 48 and 50 years for negro males and females respectively. As recently as a hundred and fifty years ago, at the close of the Revolutionary War, the expectation of life at birth in the United States was approximately 30–35 years. By 1930, in Massachusetts, it had increased by about 26 years for females and 24 years for males. This increase apparently affects almost all ages except those over 50, but has been most rapid in childhood, adolescence, and early adult life. The trend has even been accelerated of late years, and the increase in expectation of life since 1900 is equal to the increase in the previous hundred years. Curiously enough, since 1930, negro males between 20 and 50 years of age have suffered a loss of expectation of life of nearly 3 years at every age. Perhaps strange is the fact that the increase in expectation of life at birth since 1900 in the white population has been about 60 per cent. greater among urban residents than in rural communities. The areas of high mortality in the white population are in the south-west—which fact may be partially explained as due to the inclusion of Mexicans, Indians, and invalid persons—and along the Atlantic coast from Maine to Florida. The greatest expectation of life is found in the north-west. As Dorn points out, the remarkable increase in expectation of life since 1900 cannot be repeated in the next generation unless methods are developed for prevention and control of the diseases of middle life and old age. It has been estimated that the ultimate longevity obtainable with present knowledge is about 70 years, or only about 10 years more than it was in 1930.

PARIS

(FROM OUR OWN CORRESPONDENT)

THE 40-HOUR WEEK IN HOSPITAL

Dr. Georges Duhamel, an obscure physician but an eminent man of letters, threw an apple of discord into the Academy of Medicine the other day when he devoted his maiden speech to the effect of the 40-hour week on hospital services. Yet the problem seems to be one not so much of hours as of the spirit of the personnel, from top to bottom. Most of us are feeling disgruntled nowadays over some aspect or other of our work, and with prices rising daily and the uncertainty of balancing the budget it is difficult to face the present hospital situation with an unruffled mind. In a few months, when the necessary administrative adaptation to the requirements of the 40-hour week has been made, it will be much easier than it is at present to appraise this revolution at its true value. To vary President Lincoln's famous dictum, it is well not to vet a horse while it is fording a stream.

We are on surer ground when we consider hospital finance. Hospital budgets were recently discussed by a late Prime Minister, Monsieur Herriot, who as Mayor of Lyons could produce some painful home truths about the cost of hospital administration. Be it noted that until 1918 the hospitals of Lyons were unique in France in that they balanced their budgets out of their own resources. Since then the cost of living has risen enormously, as have the numbers of persons employed. On Oct. 1st, 1937, the Grange-Blanche Hospital in Lyons sheltered 1565 patients and was served by 1504 persons, of whom 236 belonged to some religious order, 156 belonged to the medical staff, and 1112 were lay workers of various descriptions. In other words, to every patient a hospital attendant, or nearly so. In 1920 the budget of this hospital was balanced with a modest 4,300,000 francs. The corresponding figure for 1926 was 10 millions, for 1936 it was 12½ millions, and Monsieur Herriot hazarded the guess that 18 million francs would be required to balance the budget of 1937. At the present time the cost of caring for a patient in a medical ward is 48 francs per day, and in a surgical wards 50.50 francs per day—bigger sums than those charged in certain private clinics. Good socialist that he is, Monsieur Herriot did not so much as breathe a hint as to going back on the 40-hour week, but he wondered if one could not work a little harder during each of these 40 hours!

EXCHANGES BETWEEN FRENCH AND ENGLISH DOCTORS

Bulletin No. 36 of the Association pour le Développement des Relations Médicales entre la France et les Pays Étrangers (address: Salle Béclard, Faculté de Médecine, 12, Rue de l'École-de Médicine, Paris) contains a note on the organisation of family exchanges between French and English doctors under the auspices of Monsieur Marois of the French railway system. The idea is that French doctors should spend a few weeks in the homes of English colleagues, and vice versa. The coöperation of the French railway system in this scheme takes the form of a 40 per cent. reduction in railway fares. This system of exchanges has already been put into operation on behalf of others than doctors.

The same number of the bulletin contains a notice from the rector of the University of Paris concerning the reorganisation of the Office du Tourisme Univer-

sitaire which is to have in each French university a fully qualified representative to deal with travelling and other activities of the students. It is hoped that this body will satisfactorily replace the agencies with more or less thinly disguised commercial aims, and will organise during the holidays group visits between members of the different universities. Ultimately there should be a useful network of lodgings available for students throughout France under the auspices of university authorities.

THE HEALTH OF FRANCE IN 1936

Prof. Tanon's report to the Academy of Medicine on infectious diseases notified in 1936 was on the whole reassuring. What was surprising as well as reassuring was the statement that the part France has had to play as a more or less involuntary host to thousands of Spanish refugees has not involved it in any serious epidemic in spite of the appalling destitution of many of the Spaniards. Scarlet fever has diminished considerably, the notifications for 1936 numbering only 4876 as compared with 5071 in 1935, and 6920 in 1933. On the other hand there has been a considerable rise in the number of notifications of measles. But although as many as 8979 cases were notified there were only 214 deaths from this disease. Typhoid fever seems to have behaved patchily during the year under review, and while there was a substantial decline in the Seine-et-Oise areas, the French littoral was worse off than ever, thanks probably to the conchological propensities of the natives whose taste for raw shell-fish needs correction. With regard to infantile paralysis, which is on the decline, Prof. Tanon advised the public health authorities not to be too exigent in demanding very early diagnoses, for in this disease any hustling of the medical profession only means a crop of notifications with a high proportion of errors. In the Seine area, for example, only 41 out of 51 diagnoses of infantile paralysis stood the test of time and mature clinical observation.

SELF-ADVERTISEMENT AT MEDICAL CONGRESSES

Dr. J. Noir, the director of *Concours Médical*, dissects with nimble rather than merciful fingers the motives prompting many doctors to contribute papers to medical congresses. The very title of his editorial (Les Abus d'une Publicité Médicale Licite: Les Congrès) gives more than an inkling of what is to follow. "Many communications are made with the sole object of giving publicity to the name of the author, who usually does not care a rap for the opinions that may be formed of the value of his work provided his name appears in print . . . and that this publicity will bring him some patients." Whereupon Dr. Noir proceeds to disillusion the aspirants to such publicity by pointing out that the very number of medical congresses and reports thereto assures their neglect in the columns of the medical press. Even to print the titles of all such communications would be a physical impossibility for the medical journals. The pity of it all is that the few valuable communications are apt to be drowned in this spate of self-glorification. Dr. Noir's device for sifting the corn from the chaff is to recommend the former to the good services of medical societies in which its value can be fairly appraised after expert discussion. In other words, the select medical society is the best forum for the recognition of serious work, whereas the more pretentious medical congress is apt to be a snare and a delusion, not least for the would-be self-advertiser.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

FROM A BACTERIOLOGICAL BACK-NUMBER

II

I HAVE recently been talking to a number of young men who have been up for their final M.B. examinations. They were showing signs of overstrain in body and mind and they did not scruple to voice their dissatisfaction with the demands that had been made upon them. There can be no doubt that if something is not done about it the exactions of the modern medical curriculum will break down under its own clumsy weight. More and more load is being put on and practically nothing is being taken off. The aspirations of youth are insuppressible and the human mind almost miraculously resilient and thus as yet we see only the strain and avoid the breakdown. Our young medical men, thank heaven, can still make shift to keep their interests wide and to retain some small measure of self-determination. Yet teacher, examiner, and the student himself seem to have been caught up in a circle which all agree is vicious yet nobody seems able to break. The purely technical aspects of the medical training seem, as time goes on, to get more and more exacting and all-consuming until there is a real danger that the wider cultural elements may be squeezed out.

* * *

The evil starts before medical education, as such, is formally begun. It is now almost the rule for the boy taking up medicine to begin seriously to prepare for medical examinations when he is not more than 15 or 16 years old. There is no doubt that the scientific subjects as taught to first M.B. students are quite an unsuitable diet for a boy under 18. As it stands it is intellectually and morally vitamin-deficient. Necessary though science may be in the training of the finished doctor, it is only one of the elements which must go to the making of that strange compound. No branch of medicine has yet reached the stage of cold rationalism when the judgment and sympathy of its practitioner can be dispensed with. A doctor must more than ever before be what Locke calls a "whole, sound round-about" man. We want more science in medical education but we want a good deal more than science. As a modern poet has said, "a refined man will never become vulgarised by science, but it seems very clear that science can never refine the vulgar." Of what the preliminary school training should consist it is not for the purely medical teacher to decide; it probably matters little what a boy learns provided it be sufficiently broad and humanistic. One wonders whether there can be any substitute for the study of the Greek and Latin spirit. Perhaps when the snobbery of the old classical tradition dies down we shall reinstate the study of the Greek spirit without demanding the mastery of the ancient language. We are content to study our Old Testament without learning Hebrew. I wonder

why we should be so shy of reading Plato because we know no Greek.

* * *

It is not only in the curtailment of school education that the modern impatience with all but the most technical parts of the medical education shows itself. As illustrating the gradually constricting outlook we may instance the recent history of the natural science tripos at Cambridge. Before the war the great majority of medical students took honours courses in one or more of such subjects as botany, chemistry, and zoology. Now few are interested in any subject that is not part of the bread and butter of medical practice. The modern student is even impatient of such semi-professional subjects as pathology, biochemistry, or pharmacology. Only last week I heard some young qualifying students bemoaning the fact that they had to waste their time learning pharmacology. They could understand the necessity of learning to write prescriptions but they seemed to think that to know the verifiable action of drugs was superfluous. All this shows that the present medical course is giving rise to a large amount of mental indigestion. I am no Victorian grandfather but I doubt if the modern medical student is as well prepared for medical practice as we were in the leisurely, care-free pre-war days, and he has lost much of the old *joie de vivre*. A modern divine has said that "if you want a man to think deeply and earnestly, and with the fear of God upon him, set him thinking of education." If I had remembered this warning in time I should never have started writing about medical education. Nebridius, the friend of St. Augustine, was right in hating exceedingly a brief answer on a great question, "specially such as related to doctrines of faith."

One thing seems certain—if we taught and examined less, our students would learn more. If we add anything further to the medical curriculum let it be spare time.

PUBLIC HEALTH

SCHOOL MEDICAL TREATMENT

THE main aim of the school medical service has always been to prevent disease, but increasing provision has had to be made nevertheless for ensuring that treatment was available to those children who needed it. Local education authorities are obliged to provide for the treatment of defects of the eyes and teeth, minor ailments, and chronic tonsillitis and adenoids, and many of them have found it advisable to include also the treatment of ear, nose, and throat defects generally, orthopædic conditions, chronic and subacute rheumatism, speech defects, ringworm, and behaviour disorders, and to provide for artificial light treatment. Wherever possible use has been made of existing facilities outside the school service; in 1936 310 local authorities had arrangements with hospitals for providing treatment, and a large number of children are referred to their own doctors for advice.[1] The extension of the medical activities of municipal authorities as a result of the Local Government Act, 1929, offers an opportunity for the public health and school medical departments to pool their resources with benefit to both. The former can treat children with ear, nose, and throat defects and the like at their municipal hospitals, and the latter can arrange to deal with children under school age at their school clinics. The great majority of treatment schemes are, however, the result of arrangements with voluntary hospitals, aided both financially and otherwise by the widespread hospital contributory schemes. The free interchange of information about individual children between hospital and school medical officers is of great value, and its full possibilities may not yet have been fully realised.

The last year has seen a considerable increase in the number of permanent school clinics. Besides dealing with minor ailments—septic sores, impetigo, and other skin diseases—and carrying out dental, orthopædic, and artificial light treatment and refraction work, these clinics are being used increasingly as places where parents may obtain more general advice, the medical officer referring a child who needs treatment to the family doctor. There is an increasing tendency for the provision of joint health centres such as the new one at Bristol to include children under school age. Greater attention is being paid to dealing with ear, nose, and throat defects other than tonsils and adenoids, and it is being realised that the treatment of all such defects should be under the control of one specialist. A number of authorities now make provision for the orthoptic treatment of squint, usually through a voluntary hospital, though a few of the larger ones have installed the necessary apparatus in their own clinics. The greatest opportunity for coöperation between public authorities and voluntary organisations lies in the provision of orthopædic treatment. A voluntary organisation usually provides the orthopædic hospital and its satellite clinics, and the local authority may supply the actual premises for the clinics and finance in the form of fees for the treatment of their cases. At least one local education authority has appointed a whole-time teacher to conduct corrective classes in schools, and there is likely to be increased coöperation between those responsible for physical training and the orthopædic service. The treatment of children with acute rheumatism has always been regarded as the responsibility of the public health authority, but there is need for general practitioners, voluntary hospitals, and the education authorities to work together if children are to be satisfactorily provided for and educated at all stages of the disease. In 1936 111 local education authorities provided artificial light treatment, an increase of 6 over 1935, and 35 school clinics undertook the treatment of ringworm of the scalp. It is usually found more convenient for ringworm to be dealt with by voluntary hospitals or private practitioners, as the apparatus is expensive and the number of cases is generally small.

The arrangements made by local education authorities for a psychological service for the children under their care have extended considerably in the last year. At Birmingham, Bristol, Cardiff, and certain other large towns there are fully staffed child guidance clinics maintained by the authority. At Leicester a psychological service is maintained by the authority and staffed by a non-medical psychologist and social workers, whereas in Derbyshire and at Reading and Bath child guidance work is carried out by the education authority's staff as part of their general duties. Elsewhere authorities contribute to clinics established by voluntary hospitals or other

[1] See the Annual Report of the Chief Medical Officer of the Board of Education for 1936 reviewed in our last issue (p. 41).

organisations. Such schemes are not possible everywhere, and at present it is difficult in the northern and eastern counties to obtain skilled advice on children who present problems of behaviour or of disordered personality, or whose difficulties with school work are not due to dullness or mental deficiency.

It is satisfactory that the union between the school medical service and the maternity and child welfare service is gradually becoming closer, though it is still the child between one and five years who receives least medical supervision, and at the other end of school life the new Factory Act makes provision for the passing on of information from the school medical officer to the factory surgeon.

A New Food and Drugs Code

The law of food and drugs has now been tackled by the experts who drew up the official codes that were passed into law as the Local Government Act, 1933, and the Public Health Act, 1936. It will be recalled that the Minister of Health appointed in 1930 a "local government and public health consolidation committee" to rewrite the laws and to consider under what heads the existing enactments should be grouped and what amendments were desirable to secure simplicity, uniformity, and conciseness. The legal advisers of the Ministry of Health may be complimented on having set up an excellent tradition in clarifying the law. The process is now carried to another stage. The great Public Health Act of 1936 did not deal with the whole of public health law. It covered the prevention and treatment of disease and such matters as drains, sewers, buildings, water-supply, noise nuisance, hospitals, and maternity centres. It did not cover food and drugs, milk and dairies, artificial cream, bread and flour, margarine, ice-cream, horseflesh and shell-fish, markets, slaughter-houses, and cold-air stores. These topics are now dealt with in the admirable Draft Bill (Cmd. 5629: 1*s.* 6*d.*). It is accompanied by the committee's Third Interim Report (Cmd. 5628: 1*s.*) which explains the contemplated grouping and amendment. To round off the rewriting of local government there remain various odds and ends of highway law still based on statutes of Henry VIII (as to bridges), William and Mary, and the century-old Highway Act of William IV. The Ministry of Transport is promoting a consolidation Bill for this purpose. When it is completed and passed a fine piece of work will have been done for facilitating local administration—a function, after all, largely in the hands of laymen and amateurs.

Our legislation on food and drugs has pursued two very different aims. The earlier Acts are mainly directed to protecting the purchaser from fraud; these were largely consolidated in 1928. The later provisions aim at safeguarding health. Some of the modern law is to be found in the common-form clauses which appear in Local Acts; some of it is in Public Health Act regulations. It is obviously proper to bring all these into one uniform code. Thus, to take a minor example, Clause 38 of the new Draft Bill prohibits the inflation of meat carcasses. One of the Public Health (Meat) Regulations of 1924 forbade the inflation of a carcass "with the breath or in any other manner likely to cause infection or contamination." A standard clause in many Local Acts enacts this prohibition but without the qualifying words above quoted; the object of the extension is to prevent fraud on the purchaser. The new draft clause reproduces the standard clause but restricts it to carcasses intended *for sale* for human consumption. One of the changes in the new Bill is the substitution of this expression "for human consumption" in lieu of various phrases such as "intended for the food of man." The Milk Acts contained several references to milk intended for sale "for use *in the manufacture of products* for human consumption." It is surely an illegal selling of unsound food whether or not it is intended that after sale the food is to be manufactured into some other product before being consumed. One important feature of the new code is that (except in the part relating to markets, slaughter-houses, and cold-air stores) the Bill is to apply to London. On general grounds of administrative convenience it was a pity that there should have been two separate public health codes in 1936, one for England except London and the other for London, when so much of the law was common to both.

A "Flying Squad" in London

Islington is shortly to have the first maternity emergency unit to be established in London. The unit will be worked through University College Hospital, to which the borough council of Islington will make a grant of £25 towards the initial cost of equipment, and will pay a fee of seven guineas whenever the unit is called out. The staff will consist of an obstetrician of consultant standing with three deputies, a medical officer to assist him, and a qualified nurse, and these will be immediately available to any doctor attending a confinement within the borough. Midwives will be expected where possible first to obtain the assistance of a doctor, but may call the unit direct in cases of extreme urgency. These emergency units, it may be recalled, were first advocated by Prof. E. Farquhar Murray in 1929, and one was established in Lanark in 1933; but it was not until 1935 that such a unit was initiated in England at Newcastle-on-Tyne. Since then other local authorities, in Northumberland and Durham, Birmingham and elsewhere, have adopted the scheme, which has been officially blessed by the Ministry of Health. The units are intended to meet the needs of parturient women who from shock, hæmorrhage, or other causes are too ill to be moved to a maternity hospital. The nurse reaches the patient's home in an ambulance, which stands by in case it is decided possible to send the patient to hospital. The medical staff are summoned and travel separately. In practice the calls made on a unit of this kind are not numerous—at Newcastle they amounted to 20 in eighteen months—but they have unquestionably saved lives, and the knowledge that expert help is available must materially lighten the anxieties of maternity work in industrial areas.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED DEC. 25TH, 1937

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 2244; diphtheria, 1291; enteric fever, 19 (22 "expected"); pneumonia (primary or influenzal), 1093; puerperal pyrexia, 123; cerebro-spinal fever, 27; acute poliomyelitis, 5; encephalitis lethargica, 6; dysentery, 270; ophthalmia neonatorum, 67. No case of cholera, plague, or typhus fever was notified during the week.

There are 141 fewer notifications of dysentery than in the previous week, but it should not be forgotten that the week's

(*Continued at foot of following page*)

CROYDON TYPHOID INQUIRY

DR. HOLDEN CROSS-EXAMINED BY COUNSEL FOR THE SOUTH CROYDON TYPHOID OUTBREAK COMMITTEE

(*Continued from p. 57*)

IN the course of his cross-examination of Dr. Holden on Dec. 28th Mr. Lyons quoted a letter from Lord Dawson and Sir Kaye Le Fleming in the *Times* of Dec. 2nd.

Mr. Lyons: It begins in this way: "Sir, In the letter published in your issue of Nov. 22nd, we refrained advisedly from any judgment on the cause and extension of the Croydon epidemic. On the other hand, we did suggest that, with the existence of the epidemic established 'it would have been profitable' for the M.O.H. to have sought the confidence and counsel of the medical profession in Croydon by means of chosen representatives. In not so doing the M.O.H. was following methods of administration common throughout the country, but unsuited to present-day needs, and out of accord with the public interest.... The following are our suggestions, which no doubt could be improved by constructive criticism." I will only deal with the heads of each paragraph: "(1) An Advisory Hospitals Board, consisting of representatives, lay and medical, of (*a*) municipal hospital and (*b*) voluntary hospital authorities in each local area.... (2) To bring the two groups of doctors together there should be the habit of responsible conference between them.... (3) The officers of the health services (excepting the M.O.H.) should, where possible, be appointed from among medical practitioners in their area.... Such a scheme would bring preventive and curative medicine into close coördination...."

In reply to Mr. Lyons Dr. Holden agreed that there are many ways in which coöperation in an emergency can take place if the machinery is already in existence. He had never ignored the services that medical men in the borough could give him, and in this outbreak he had followed the usual practice of medical officers of health. Later, in cross-examination by Mr. Forbes, Dr. Holden stated that a standing committee of local medical practitioners would be of great assistance to the M.O.H., and, if such had been in existence in Croydon, he would gladly have coöperated with it and provided it with any information in his possession.

(*Continued from previous page*)

returns are likely to be incomplete. A large proportion of the cases were again reported from the home counties—e.g., London 72, Kent 25, Essex 19, Surrey 11; other counties with considerable numbers being Norfolk 32 (29 in Norwich), Devon 28 (scattered R.D.'s), Stafford 20 (various U.D.'s and R.D.'s).

The number of cases in the Infectious Hospitals of the London County Council on Dec. 31st was 4246, which included: Scarlet fever, 831; diphtheria, 1549 (diphtheria carriers, 41); measles, 445; whooping-cough, 349; puerperal fever, 10 mothers (plus 7 babies); encephalitis lethargica, 283; poliomyelitis, 3. At St. Margaret's Hospital there were 8 babies (plus 21 mothers) with ophthalmia neonatorum.

Deaths.—In 125 great towns, including London, there was no death from small-pox, 4 (1) from enteric fever, 31 (1) from measles, 7 (1) from scarlet fever, 18 (6) from whooping-cough, 37 (1) from diphtheria, 49 (12) from diarrhœa and enteritis under two years, and 46 (4) from influenza. The figures in parentheses are those for London itself.

Three deaths from typhoid were reported from Croydon. Liverpool had 13 deaths from measles, Manchester 7, Sheffield 2. Liverpool also reported 4 deaths from scarlet fever; Birkenhead 3 from whooping-cough. Diphtheria was fatal in 26 great towns, Liverpool reporting 5 deaths, no other great town more than 2.

The number of stillbirths notified during the week was 268 (corresponding to a rate of 51 per 1000 total births), including 37 in London.

DR. HOLDEN CROSS-EXAMINED BY COUNSEL FOR THE CROYDON DIVISION OF THE B.M.A. AND THE CROYDON LOCAL MEDICAL AND PANEL COMMITTEE

In further cross-examination of Dr. Holden on Dec. 29th, Mr. Forbes drew his attention to a resolution passed at the general meeting of the Croydon division of the B.M.A. on Nov. 9th, which read:

"Regarding the recent outbreak of typhoid fever in the borough, this meeting deplores the fact that the first intimation of the outbreak to medical practitioners was through the medium of the daily press."

Dr. Holden did not agree that this was a fair complaint so far as the 140 doctors were concerned to whom he had sent notices on Nov. 4th. In reply to a question whether he ought not to have got into conference with local practitioners as soon as he thought a serious outbreak would occur, Dr. Holden replied that he had already notified them of the occurrence of typhoid, and, as soon as he found that he was not getting along as fast as he would have liked, he had appealed to the authority whom he thought would give him the quickest and best help. Even now, looking back, he did not see how the local doctors could have helped him, and even when the water was definitely suspected he could not see that it would have helped to have told them. He had had no instructions from the public health committee to keep secret any suspicions that he might have had about the water. The policy of the committee was not to make matters public, but there was no specific reference to any particular matter.

(At this point the evidence of Dr. A. W. A. Davies of Croydon was interposed. He stated that he had attended a Mrs. Wilson of Pampisford-road, Croydon, on Oct. 13th, 1937, and, together with Dr. A. C. Hampson, had decided that she was suffering from typhoid fever contracted through eating oysters at Cannes some 10 to 14 days previously.)

Dr. Holden having been recalled, Mr. Murphy asked Mr. Forbes to bear in mind the distinction between collaboration between the M.O.H. and the local medical profession in the absence of an outbreak, and collaboration after an outbreak has taken place.

DR. HOLDEN CROSS-EXAMINED BY COUNSEL FOR THE STAFF OF THE CORPORATION

Mr. Dingle Foot, who is appearing for certain members of the staff of the Croydon public health department and borough engineer's department, asked Dr. Holden to look at the results of the analyses taken from the four wells on July 14th, 1937.

Mr. Dingle Foot: Had you the analysis of the sample taken from Addington on that date?—Yes.

Mr. Dingle Foot: And you see the remarks at the bottom: "... The filter is not effective and may be acting as a breeding ground for organisms. I recommend sterilisation ..."?—Yes.

Mr. Dingle Foot: Then if you turn to the next one, which is Surrey-street, you notice at the bottom Mr. Dibdin says: "I recommend chlorination."—Yes.

Mr. Dingle Foot: Then on Stroud Green he says: "... Chlorination is not essential but of course desirable"?—Yes.

Dr. Holden agreed that he had received these analyses and that they had been discussed at a meeting on July 20th at which the borough engineer and Mr. Jones, the chief water assistant, were present. He did not remember Mr. Jones saying that Mr. Byles of the Metropolitan Water Board had recommended that chlorination should be at the rate of 0·15 part per million; the usual figure that he had in mind

as a measure of precaution in an ordinary water-supply was 0·05 part per million.

DR. HOLDEN RE-EXAMINED BY HIS OWN COUNSEL

In reply to Mr. Sandlands, Dr. Holden agreed that the statement he had issued on Nov. 9th had been drawn up in a hurry and might have been clearer in certain parts. Mr. Sandlands quoted a passage which stated that the report of the Ministry of Health showed contamination from the gathering ground of the Addington well; he thought that Mr. Lyons did not appreciate the distinction between contamination and infection, but imagined that when a case was notified you could run round and find the *B. typhosus* in the tap of the patient's house. Dr. Holden said that the life of a typhoid bacillus in water depended upon the water and its temperature and might be from a few days to three to four weeks. The incubation period might be as long as 40 days, but was usually from 5 to 23 days, and before notification there was a further period of about 10 days before the patient was diagnosable as typhoid. The life of the bacillus was therefore pretty well exhausted before a sample of water from the patient's house could be examined. The organism had vanished before you knew that an epidemic had begun. On Nov. 4th he had received the report on the sample of water taken from the Addington main on Oct. 29th, showing the presence of *B. coli* in 10 c.cm., and if he had looked on Oct. 28th, 29th, and 30th in the houses where the first few cases were reported he would not have expected to find anything different from what the analysis showed.

Referring to the condition of the water from the Addington well before this outbreak, Mr. Sandlands read a report from the analyst dated Nov. 4th, 1936, which said: "This well water needs treatment before distribution. Contaminated rain-water is finding access." There were still signs of contamination in a sample dated Nov. 20th, 1936, but from then until Sept. 26th, 1937, there was nothing in the analyses to make Dr. Holden suspect that any contamination was getting into the water from the gathering ground. In October, 1937, therefore, there was no particular reason for suspecting the water-supply, and Dr. Holden had to inquire into other possible causes. Dr. Holden stated that he attended a meeting of residents in St. Augustine's-avenue on Oct. 31st, at which three main suggestions for inquiry were put forward: first, the repairs in the mains in the neighbourhood of St. Augustine's-avenue; then a cesspool at a cottage in Halinggrove; and finally flies and such things. After this meeting Dr. Holden had had samples taken from the cesspool, with negative results; he had followed up the matter of the repairs to the mains with the borough engineer and satisfied himself that they had nothing to do with the outbreak; and, although he did not attach much importance to the fly theory, he had followed that up too. He had had analyses made of the storage tanks in the houses in which cases had occurred, and the only one found to be contaminated was that at Russell School, Ballards, where colon bacilli were found.

With reference to camping grounds within the borough, Dr. Holden said that there had been no occasion for complaint. During this year there had been about 4000 boy scouts on and off in these camps; these boys had to carry out the regulations laid down in scout law, which in his opinion was satisfactory. In addition to these there was a colony of some sort, he thought a nudist colony, in the middle of a wood, but he had not been able to satisfy himself that any nuisance was being caused by it. He had had blood-tests taken from the members of a gipsy encampment to see whether any of them were carriers and no carrier had been found.

In reply to a question by Mr. Sandlands about Fisher's farm, which is on the gathering ground of the Addington well, Dr. Holden stated that no danger of typhoid was to be expected from farmyard manure unless there is an admixture of privy refuse, and that he had had the privy at this farm tested for typhoid bacilli with a negative result. He thought it possible that, especially after heavy rain, there might be a certain amount of contamination of the well from this farm. The gathering ground also contained a pig farm with 12,000 pigs, but Dr. Holden had not heard of any instance of pigs carrying typhoid. Bore-holes dug in that area had shown that soakage only went down about 12 feet and there was at least a further 8 feet of soil before chalk was reached, which should be sufficient to eliminate contamination unless actual fissures were present.

In January, 1937, there had been a fatal accident at the Addington well, and Dr. Holden had learned that thereafter the water was pumped to waste and chlorination was applied before it was again put into supply. As the result of inquiries Dr. Holden had found that the men who worked in the well were specially clothed, had done no sewer work for a considerable time beforehand, and were given instructions not to excrete or urinate in the well. While work was in progress the water was pumped to waste and it was chlorinated before being put into supply again. He could not have suggested any further precautions. Before this outbreak he had not heard of a Widal test being done on all workmen working in a well, but he had heard of it since.

Dr. Holden agreed with what was said by the chief medical officer of the Ministry of Health in his report for 1936 that water undertakers who possess supplies from strata such as chalk, in areas which are becoming increasingly built over, have a grave responsibility to the consumers; that analyses of the water at infrequent intervals will not ensure that sudden unexpected pollution will be recognised early enough to prevent an outbreak of intestinal disease; and that in some areas it is almost certainly desirable to make daily examinations of the water. At Addington there were side by side two glass tubes of flowing water, one filtered and one unfiltered, in which any change in the character of the water could be observed immediately. There was a battery of pressure filters, a chlorination plant, and an ammoniator, so that effective treatment could be commenced immediately any necessity arose.

DR. HOLDEN RE-EXAMINED BY COUNSEL FOR THE CROYDON CORPORATION

Sir Walter Monckton read a long passage from Thresh's "Examination of Waters" (of which Dr. Suckling is now a joint author), dealing with the vitality of typhoid bacilli. According to this authority: "Survival is influenced by many factors such as the nature of the containing material and its bacterial or other biological content; the presence of agents or substances inhibitory or destructive to bacterial life, and of these sunshine and temperature are important. . . . It is usually accepted that under the conditions prevailing in this country, 99 per cent. of typhoid bacilli die in less than five days, and 99·9 per cent. in seven days. . . ."

In answer to a question of Sir Walter's Dr. Holden agreed that it was very important in such an

investigation as this not merely to find as far back as possible the causes of infection, but also the carriers who distribute it around. In the present investigation he had had the assistance of Dr. Conybeare from the Ministry of Health, who had been associated with the late Dr. Vernon Shaw in investigating the Bournemouth outbreak.

Mr. Murphy: Dr. Holden . . . when you get an outbreak of typhoid fever—I am choosing my words carefully and am excluding paratyphoid—as distinct from isolated cases, and you are able to trace back the source of the infection, do you not always come, not necessarily at the first stage or the last stage, but at some stage, to water?—No, not in every instance.

Mr. Murphy: Can you give me an example of a typhoid outbreak . . . where you have not got somewhere to water?—I cannot think of any one at the moment.

Mr. Murphy: Do not think me frivolous, but, like boiling oil in a light opera that most of us are familiar with, water always comes into it somewhere, does it not?—Yes, I think probably in actual practice that is so, but it need not necessarily be so. You could get milk infected directly from a patient or a carrier. . . .

Mr. Murphy: What is passing through my mind is this: If you are faced with an outbreak, or even the possibility of an outbreak of typhoid, does not your mind leap to water?—I think of water, yes, and I did think of water.

In replying to further questions by Mr. Murphy, Dr. Holden said that as far as he knew there was no definite standard of purity of water, and that a person who sells you water which is full of *B. typhosus* is under no penal consequences at all. Mr. Murphy suggested that this was a matter upon which the two eminent Members of Parliament present might well collaborate. On this subject Mr. Lyons quoted a section from the Public Health Act, 1936, which reads:

"A local authority who supply water under this Act shall secure that the water in any waterworks belonging to them from which water is supplied for domestic purposes is wholesome."

He also quoted a lecture by Colonel Harold, director of water examination for the Metropolitan Water Board:

"In this country . . . we have standards of housing, food and drug acts, milk regulations, infectious disease enactments, factory acts, highway codes, &c., but, strange to relate, no standards of water-supply."

When the inquiry reopened on Dec. 30th, Dr. Holden reverted to the suggestion of Mr. Murphy that all modern typhoid epidemics had been connected with water in some way. He said that he had looked the matter up over night and had found that there have been quite a number of small outbreaks due to articles of food and with no direct connexion with a public water-supply at all, for instance, the outbreak at Coventry in 1933 which was due to pressed beef and a carrier, and those at Penzance in 1923 and at Camborne in 1923 due to milk. In neither of the last two had water been implicated. There was a larger outbreak at Luton in 1924 due to ice-cream and one in Manchester in 1913 due to mussels. Mr. Murphy pointed out that he had not suggested that a public water-supply was always implicated.

DR. HOLDEN EXAMINED BY THE ASSESSORS

In reply to Sir Humphry Rolleston, Dr. Holden said that a medical officer of health had two main duties to perform—one to his local authority and one in his position as a medical practitioner. He should be available to advise and be consulted by the members of the authority and at the same time he should put before the local medical profession the facilities provided by the authority and try to act as a link between them and the medical profession. The relationship between the M.O.H. and the Ministry of Health should be a close one, and he always looked upon the Ministry as his adviser in case of need, though not in any way as his master.

Dr. Holden read a statement by the superintendent of police at Croydon to the effect that on Dec. 6th, 1937, 1200 notices had been delivered by the police to unoccupied houses and shops, so that when they became reoccupied the new occupants would empty their cisterns. As far as he knew no case of enteric had occurred in occupants through getting possession of such houses.

Mr. Gourley read a paragraph from the statutory rules and orders of the Ministry of Health prescribing the duties of a medical officer of health: "A medical officer of health shall inform himself as far as practicable respecting all matters affecting or likely to affect the public health in a district and be prepared to advise the local authority on any such matter."

Mr. Gourley: Well, we have gathered in the course of the evidence that your advice in the matter of water-supply apparently has been limited to a discussion of the results of chemical and bacteriological examinations of the water?—Yes.

Mr. Gourley: But did you not conceive it to be part of your duty to inspect the gathering ground, not for your own peace of mind, as you put it, but as part of your duties?—I have from time to time inspected the gathering ground, more especially with regard to the Addington well.

Dr. Holden agreed that he had realised that in certain circumstances Fisher's farm might be a menace to the supply, but as there had never been any evidence that the farm was an actual menace he had not made any representations to have the drainage of the farm connected to the sewer in Fetherbed-lane. Dr. Holden said that he might have given greater weight to the question of water-supply if he had realised that the water at Addington was not being chlorinated and that rapid filters were being used without coagulant. He agreed that the glass tubes in which the water could be seen before and after filtration would certainly not have indicated any change in the routine treatment of the water, but only that the water was clearer after passing through the filter.

THE BOROUGH ENGINEER EXAMINED

Dr. Holden was followed in the witness-box on Dec. 30th and 31st by Mr. C. E. Boast, borough engineer, and Mr. H. F. Brandram-Jones, formerly chief water assistant at Croydon and now assistant water engineer at Brighton. Mr. Boast explained that his general object was not merely to make the high-level and low-level water-supplies more readily interchangeable than before, but also to arrange for greater use of the "award and agreement water" of the Metropolitan Water Board. He had in mind, further, the question of air-raid precautions. When he took over his duties from his predecessor, he received no special warning about the gathering ground. He stated that the Addington well, when the men were down and in contact with the water, was pumped to waste; when the men were not in contact with the water, it was pumped to supply without either filtration or chlorination. In June, 1936, the well water was not so good and the Addington well was chlorinated in July at 0·05 part per million. In January, 1937, when a workman died at the well, and again in May, 1937, when there was discoloration from clay from another well, a heavier dose was used. The chief water assistant was responsible for the

actual work and spent much of his time at or down the well. With him was the mechanical superintendent, Mr. Ellis, and the mechanical foreman, Mr. Blackshaw. Mr. Boast said that he gave directions to the chief water assistant that the men working in the well should be very carefully chosen. He had in mind the risk of consumption from spitting. The question of a typhoid germ carrier never occurred to him. A report dealing with the Caterham outbreak in 1879 was put to Mr. Boast: it stated that a workman suffered from fever with much diarrhœa; some of his excreta accidentally became spilt from a bucket in the well, with the result that 352 people suffered, 21 fatally, from enteric fever. The witness said that he would have consulted the medical officer if he had thought there was the slightest danger. He had never heard, before the outbreak at Croydon, of men being tested for typhoid prior to descending to work in a well or adit. He had heard of one case, at Brighton, since the outbreak; he could not say if the workmen were examined by a blood test or merely by their history. At this point the chairman of the tribunal, Mr. Murphy, observed that, according to his instructions which came from a very high source, the only effective test for *B. typhosus* was bacteriological examination of the excreta and urine. Counsel suggested that this might mean six weeks or two months in hospital. Other answers by Mr. Boast indicated that no log was kept of the chlorination dates before the outbreak, that the Addington well was not chlorinated for a month before the outbreak, that he learnt (by ringing up Mr. Brandram-Jones at Brighton), after the meeting of local residents on Nov. 3rd–4th, that the water from the Addington well was not being chlorinated, that he himself had no specialised knowledge of chemistry (though he had taken chemistry in the London matriculation examination) but he had enough everyday knowledge to appreciate what a specialist might tell him, and that his previous appointments before coming to Croydon were at places which did not get their water-supply from the chalk. The chairman asked him if he had now formed any opinion as to the source of contamination in the well. He replied that he felt it must be from the gathering ground; the men were trustworthy and careful, but he admitted there was the possibility of an accident with the bucket. "Even now," said Mr. Boast, "my mind turns to the pollution from the gathering ground." "Even now," queried the chairman, "when you know that one of these men was a carrier? Have you it in your mind that the dates of that man who was a carrier being down the well fit in with the outbreak and course of this epidemic?" Mr. Boast agreed that the fact was very significant.

THE CHIEF WATER ASSISTANT EXAMINED

Mr. Brandram-Jones gave evidence of the course of the work in the well. The men were selected for physical fitness and steady nerves. Special clothing was issued. He and Mr. Ellis decided that it would be most unwise to allow the men to excrete when down the well, even with proper provision made for it. The urination of the men in the well was not discussed as they were aware that a bucket would be used. It was an ordinary type of bucket; it was kept at the top and sent down when asked for. The witness was pressed as to the possibility of the men excreting while in the well out of sight or in branch adits. He said there were no corners to which they could go: he would answer for any one of them.

On resumption of the inquiry on Jan. 3rd Mr. Brandram-Jones completed his evidence. He was asked by Mr. Gourley, the water engineer who is a member of the tribunal, whether it had not occurred to him to report, as chief assistant water engineer, to Mr. Boast, the borough engineer, upon the matter of chlorination or absence of chlorination from time to time. "Did it not occur to you to say, 'Look here, we are cutting off chlorination,' when you had in mind that it had proved so effective before?" The witness replied that, if he had thought of it, he would have mentioned it to Mr. Boast. Mr. F. S. Ellis, mechanical foreman in the water engineering department of the Croydon corporation, in the course of his evidence, said he had never seen any failure to comply with the sanitary precautions at the well. In answer to the chairman he said that the special clothing issued to a workman might be worn by another workman or a number of workmen at subsequent shifts. Mr. R. J. Jackson, chief sanitary inspector, mentioned, among other possible causes of the outbreak, the presence of 4000 boy scouts at a camping site near Croydon outside the borough boundary. The chairman indicated that it would need very strong persuasion to induce the tribunal that the *B. typhosus* found its way from this camp into the Addington well.

EVIDENCE OF WORKMEN, THE SANITARY INSPECTOR, AND THE CONSULTING ANALYST

At Tuesday's session evidence was given, anonymously, by workmen who had been employed in the well, and two of them said they had never known of any breaking of the rules made about defæcation and urination. Sir Walter Monckton requested that it should be placed on record that, according to his information, one of the workmen appearing as witnesses had suffered from typhoid during the war and had been treated in Addington Hospital.

Mr. Jackson, chief sanitary inspector, was asked by Mr. Geoffrey Howard whether Dr. Holden appeared active during the outbreak. "Did he appear to be unconcerned in the matter, or was he working very hard in investigating the cases?" Mr. Jackson replied, "I have known Dr. Holden for many years, and have never known him to be unconcerned about anything."

Dr. Suckling, consulting analyst, said that the presence of a carrier in the well was in his opinion the most likely cause of the outbreak, but the evidence was not at all conclusive. There were indications of pollution of the well by sewage. While work was going on the supply of water from the well should have been cut off if an alternative was available.

THE SERVICES

ROYAL AIR FORCE

Air Commodore Albert Victor John Richardson has been appointed director of Royal Air Force Medical Services in succession to Air Vice-Marshal Sir Alfred Iredell, who retires on March 1st. Air Commodore Richardson is at present principal medical officer at Headquarters, Bomber Command.

TRIBUTE TO SIR JOSEPH SKEVINGTON.—The main operating theatre at the King Edward VII Hospital, Windsor, is in future to be known as the Sir Joseph Skevington theatre. Sir Joseph has been appointed hon. radiologist to the hospital on his retirement from the position of senior surgeon, in charge of the radiology department. He has been a surgeon to the hospital since 1903.

NEW YEAR HONOURS

THE honours list issued last Saturday contains the names of the following members of the medical profession :—

G.C.V.O.

Thomas Jeeves, Baron Horder, K.C.V.O., F.R.C.P.
Physician-in-ordinary to the King.

K.C.I.E.

Major-General Ernest A. Walker, C.B., F.R.C.S.E.
Lately director of medical services in India.

D.B.E.

Miss Florence Barrie Lambert, C.B.E., M.B., D.P.H.
Formerly chairman of the hospitals and medical services committee, London County Council.

Knights Bachelor

Robert James Johnstone, F.R.C.S., F.C.O.G.
Professor of gynæcology, Queen's University, Belfast.

Joseph William Leech, F.R.C.S.E.
M.P. for Newcastle-upon-Tyne West since 1931.

Charles Norman Paul, M.B.
Dermatologist to the Sydney Hospital.

William George Savage, M.D., D.P.H.
Late medical officer of health for Somerset.

Charles McMoran Wilson, M.C., F.R.C.P.
Dean of St. Mary's Hospital medical school.

C.B.

Major-General W. P. Macarthur, D.S.O., O.B.E., F.R.C.P., K.H.P.
Commandant, Royal Army Medical College.

C.M.G.

Theodore Grant Gray, M.B.
Director-general, mental hospitals, New Zealand.

Philip Henry Manson-Bahr, D.S.O., F.R.C.P.
Consulting physician to the Colonial Office.

John Newman Morris, F.R.A.C.S.
Surgeon to St. Vincent's Hospital, Melbourne.

Albert Rutherford Paterson, M.B., D.T.M. & H.
Director of medical services, Kenya.

C.I.E.

Lieut.-Colonel F. A. Barker, O.B.E., M.D., I.M.S.
Inspector-general of prisons, Punjab.

Lieut.-Colonel G. Tyler Burke, F.R.C.P., I.M.S. (retd.).
Lately secretary of the Medical Council of India.

Lieut.-Colonel R. V. Martin, M.R.C.S., D.O.M.S., I.M.S.
Officiating inspector-general of prisons, Bombay Presidency.

Colonel P. S. Mills, M.B., D.T.M. & H., I.M.S.
Surgeon-general with the Government of Bengal.

C.B.E.

Surgeon Rear-Admiral Bryan Pickering Pick, O.B.E., M.R.C.S., K.H.S

O.B.E. (Civil)

Edward Pohau Ellison, M.B.
Chief medical officer, Cook Islands, New Zealand.

John Charles Fulton, M.B.
Medical superintendent, Launceston Public Hospital, Tasmania.

Miss Janet Vera Good, M.R.C.S.
Senior woman medical officer, General Post Office.

Hugh Morley Oliff Lester, M.R.C.S., D.T.M. & H.
Deputy director, Sleeping Sickness Service, Nigeria.

Rev. Peter McGregor Shepherd, M.B.
Of U.F. Church of Scotland Mission, Bechuanaland.

M.B.E.

Miss Selina Fitz-herbert Fox, M.D.
Founder and director, Bermondsey Medical Mission.

John Maxwell Hall, M.R.C.S.
Senior sanitary medical officer, Jamaica.

William Stanislaus Martin, I.M.D.
Civil surgeon, Coonoor, Madras.

Miss Pauline Versfeld Murray, M.B.
For medical services in Nyasaland.

Rai Bahadur Pitamber Pant.
Civil surgeon, Etawah, United Provinces.

Kaisar-i-Hind Medal

Major John Michael Pereira, M.B.E., I.M.D. (retd.).
Superintendent of Patna Medical College Hospital.

Miss Sarah Jamieson Rankine, M.B.
Medical officer, St. Margaret's Hospital, Poona.

Mrs. Mary Hilda Youle Remfry, M.B.
Formerly of Calcutta.

Hari Vishwanath Tilak, F.R.C.S.E.
Medical practitioner, Bombay.

PANEL AND CONTRACT PRACTICE

OPHTHALMIC BENEFIT IN THE NEW YEAR

AN insurance practitioner is required, if so desired by the patient, to furnish him with a recommendation in writing that ophthalmic treatment should be obtained. If a patient needs such treatment the practitioner is advised to issue a simple certificate on the following lines: "I am of opinion that the above-named requires a further examination of his eyes." Any special feature of the case may then be stated.

As from the first day of January certain alterations in the regulations dealing with ophthalmic benefit come into force. A committee known as "the ophthalmic benefit approved committee" has been placed by the National Health Insurance Joint Committee in charge of the administration of ophthalmic benefit and of the general arrangements for the supply of glasses to insured persons. This committee, which consists of representatives of approved societies and of opticians, has been instructed to compile a list of opticians who may undertake insurance work, and the list, which will shortly be issued, will include the names not only of individual opticians but of firms which have undertaken to comply with the committee's requirements and to employ on this work only recognised opticians. Hitherto approved societies have had discretion to permit a member to obtain an optical appliance from any optician, but henceforward a member will not be entitled to receive a grant unless his glasses have been obtained from an optician whose name is on the list. Moreover no payment may now be made towards the cost of glasses if their cost exceeds that laid down in the committee's approved scale of charges. The scale includes prices for all types of appliances commonly in demand by insured persons; it also provides for special appliances (normally this means special lenses) and specifies the charges for replacements and repairs. Insurance practitioners should note the information which must now be given by societies in the ophthalmic letter issued to members who apply for ophthalmic benefit.

Three model letters have been drawn up by the committee, one of which is for use where the society

has made arrangements with an organisation which provides both examination by a medical eye specialist and optical appliances, another is for use where the society's normal arrangements are for the service to be provided by opticians direct, and the third is for use where the society uses an optician's service but either the member himself wishes to have an examination by a medical eye specialist or the society is satisfied that such an examination is necessary. In those cases where the society has arranged for the service to be provided by an optician it is open to the insured person to have his eyes examined by a medical eye specialist, but he will be responsible for any extra cost so incurred. The society in such cases has to notify him of the grant which they will be prepared to make towards the cost of the examination by the specialist. Similarly where the society provides for an examination by a particular specialist if the member wishes to go to some other specialist he will be responsible for any additional cost.

Insurance practitioners who have been recognised as medical eye specialists should remember that if they examine the eyes of their own insured patients they are required to submit Form G.P.45 to the appropriate insurance committee. This is not necessary, of course, in connexion with the examination of the eyes of the insured patients of other practitioners.

OBITUARY

EDWARD MAGENNIS, M.D. R.U.I.

WE have to record the death on Sunday last of Dr. Edward Magennis at his home in Dublin, after a short illness, in his eighty-second year. He came from County Armagh, and after attending Queen's College, Belfast, qualified in 1880 with the licences of the Royal Colleges of Edinburgh. Four years later he took his M.D. degree, and in 1891 the D.P.H. After some 18 years in general practice at Lurgan in his native county he decided to devote himself to ophthalmology, and spent some time in studying the subject in London at Moorfields. He then set up in Dublin as a specialist in diseases of the eye, and was soon taking an active part in the medical and social life of the city, especially in the affairs of the Apothecaries' Hall and of the Irish Medical Association. He was for a term governor of the former, and for two years he was president of the latter. He represented the Apothecaries' Hall on the General Medical Council from 1914 onwards, and he was a member of the Irish Free State Medical Registration Council from its establishment in 1927. Among his other duties were those of magistrate for Counties Down and Armagh. A sociable, courteous, and courtly man, Dr. Magennis was held in affection by his medical colleagues. His two sons are members of our profession and are in practice in Dublin.

DAVID MORGAN, M.B. Edin.

Dr. Morgan, formerly medical superintendent of the Cunard Company, died in London on Dec. 26th. He was 75 years of age and his death came at the end of a long illness. His father was David Morgan of Bala, his grandfather Evan Morgan of Plasynd, Rhayader; and it was to Rhayader that the young doctor returned as general practitioner when his undergraduate education at University College and Edinburgh University ended in 1884. After a time in practice, however, he decided to visit the Far East, and went to China as ship's surgeon. On his return to England he settled in Liverpool where he collaborated with Hugh Owen Thomas and Robert Jones in their orthopædic work. Morgan was one of the pioneers of radiology in this country, and as hon. radiographer at the Southern Hospital gave valuable service. Unfortunately he was also one of the many that paid heavily for the knowledge gained, and the damage by X rays to his hands obliged him to find other employment. It was then that he took the post of medical superintendent of the Cunard Company, and in this capacity, by securing better equipment and more efficient personnel, he did a great deal to secure more adequate medical service at sea. During the late war he superintended the fitting-out of the *Mauretania* as a hospital ship, and sailed in her to the Dardanelles.

At the funeral service last week the only wreath was of blue and white flowers in the form of the blue peter, the flag a vessel flies on leaving port.

ARTHUR PATRICK BARRY, M.B. R.U.I., M.C.O.G.

Dr. Barry's death was not unexpected, for he had been ill for some months; but the news was received with deep regret in Dublin. He qualified in 1904, having gone to the Catholic University school of medicine in Dublin from his birthplace, Kanturk in Cork. Soon after graduation he was appointed assistant master of the National Maternity Hospital, Dublin, and on expiry of his term of office he began to practise as an obstetrician and gynæcologist. In this work he was very successful and inspired confidence in patients and colleagues alike, coming to enjoy one of the largest practices in his specialty in Dublin. Despite heavy and constant professional work he also made time for other interests. In his younger days he was a good association football player, and for many years he was one of the best lawn tennis players in the country. For several years past, although his active play had stopped, he was captain of the Irish international lawn tennis team. Not only was Barry respected as a consultant and associate, but, as a colleague puts it, "no more kindly or trusty friend could be found." To the poor he was generous of his activity without measure.

He died on Jan. 2nd. Of his four sons, his namesake is a member of the medical profession.

Major-General THOMAS MAUNSELL, who died at Uxbridge on Dec. 29th, had reached his ninety-ninth year. The son of John Maunsell, he was born in Dublin on July 1st, 1839, qualified L.R.C.S.I. in 1859, and entered the army in the following year. Thirty-nine years later when he retired he had reached the rank of surgeon-general. Early in this long period he had accompanied the Burma expedition and the Chitral relief force, and his service ended with four years as principal medical officer at Malta. He was created C.B. in 1896.

CONGRESS ON THE HISTORY OF MEDICINE. — The eleventh International Congress on the History of Medicine will take place in Jugoslavia from Sept. 3rd to 11th under the presidency of Prof. Lujo Thaller. Visits will be paid to Zagreb, Belgrade, Sarajevo, and Dubrovnik, and sessions will be held at each of these places. Further information may be had from the secretary of the congress, Dr. Vladimir Bazala, Vlaska ulica 95, Zagreb.

CORRESPONDENCE

OVER-ACTIVITY OF THE POSTERIOR PITUITARY

To the Editor of THE LANCET

SIR,—I should like, if I may, to call the attention of Dr. E. Idris Jones to the work carried out by Libman and myself on the influence of posterior pituitary extracts on carbohydrate metabolism, for our experimental observations in man appear to corroborate his findings in the case he reported in your last issue as "a new syndrome due to over-activity of the posterior pituitary."

In discussing carbohydrate metabolism and the pituitary gland he writes, "The relation of the posterior lobe extract (Pituitrin) to carbohydrate metabolism is . . . somewhat disputed." Libman and I (*Quart. J. Med.* 1936, n.s. **5**, 169) showed that subcutaneous injections of posterior pituitary extracts, even if repeated at half-hourly intervals for two or three doses, were without any appreciable effect on the blood-sugar; but if 50 g. of glucose be given *and* at the same time, or shortly afterwards, 0·5–1·0 c.cm. of pituitrin is injected subcutaneously, instead of the normal glucose-tolerance curve resulting a sustained hyperglycæmia follows. We showed later (*Ibid*, 1937, n.s. **6**, 157) that posterior pituitary extracts antagonised the action of insulin by retarding the peripheral utilisation of the blood-sugar.

Dr. Idris Jones's patient showed but a very slightly raised fasting blood-sugar. After taking 50 g. of glucose he had a sustained hyperglycæmia. If the subcutaneous injection of 0·5–1·0 c.cm. of pituitrin in the *fasting* state were followed by no constant or appreciable rise in the blood-sugar, he would conform fully to our experimental findings in man and additional confirmation would be afforded of Dr. Idris Jones's suggestion that the clinical findings in his patient are the expression of over-activity of the posterior pituitary.

I am, Sir, yours faithfully,

Liverpool, Jan. 1st. HENRY COHEN.

TREATMENT OF THE COMMON COLD

To the Editor of THE LANCET

SIR,—Referring to your leading article in last week's issue, it seems likely that the common cold is due primarily to a virus with secondary catarrhal infection. A personal experience some years ago lends colour to this view. A cold was running through the house of a family of five persons and I took post-nasal cultures with a guarded West swab. Each member of the family had a different microbe. It would be easy to explain this otherwise surprising result on the virus hypothesis. As quinine is said to be of value in aborting virus disease, I have recently taken five grains whenever I have felt the early tickle of a cold and, if it has not gone in an hour, another five grains. So far this has been successful.

In addition to the quinine, I have as a rule used a nasal preparation containing a vegetable oil as the excipient instead of liquid paraffin. This brings me to another point: the use of a mineral oil for local treatment of the nose. I believe the constant instillation of liquid paraffin to be dangerous, as it is so easy to allow some of this bland and soothing mixture to trickle down the pharynx and enter the trachea, and this not only in infants, on which as a cause of pneumonia you have lately commented (*Lancet*, 1937, **1**, 1239), but also in adults. It is not perhaps realised that a mineral oil is not absorbed and therefore remains in the lung. I am credibly informed that in a recent post-mortem 150 c.cm. of liquid paraffin was discovered in the lungs as the result of two years' use of a nasal oil.

I am, Sir, yours faithfully,

Harley-street, W., Jan. 3rd. H. WARREN CROWE.

ELECTRICAL INTERFERENCE IN ELECTRO-CARDIOGRAPHY

To the Editor of THE LANCET

SIR,—I have been advised by the Cambridge Instrument Co. that the use of the instrument to patient earthing lead, that I suggested in your issue of Nov. 27th last, is not without risk when using the Standard instrument as it is constructed at present. There is a possibility of inadvertently switching the patient on to the main supply.

This risk does not apply to the Portable model with which it may be used with impunity. In my letter I referred only to the Portable model, but I think it is desirable to ask you to issue this warning for the benefit of those who use the Standard model.

I am, Sir, yours faithfully,

Torquay, Jan. 1st. PAUL C. GIBSON.

"DIET AND HIGH BLOOD PRESSURE"

To the Editor of THE LANCET

SIR,—Kindly allow me to comment on the review of this book in THE LANCET of Dec. 25th. This volume was written for the non-medical reader. It is however based on an inquiry in which strictly scientific methods unusual in clinical medicine were used, the result of which has been published by the Oxford University Press under the title "High Blood Pressure." (The hypothesis at the end of the book must not be confused with the conclusions drawn from the purely experimental work.) We all know it is difficult to upset current beliefs, however slender the evidence on which they are based. This is particularly regrettable in this instance, because the volume contains an account of a method of treatment of hypertony which is the only one I know which materially prolongs the lives of sufferers from this malady.

I would suggest that my colleagues, instead of expressing doubt for no particular reason, repeat my experiments and observe clinically cases under strict scientific control, as I am doing. Those of your readers who have studied the facts as elucidated by the volume mentioned above without bias will easily convince themselves that the conclusions are based on overwhelming evidence.

I am, Sir, yours faithfully,

Liverpool, Dec. 25th, 1937. I. HARRIS.

ROYAL SANITARY INSTITUTE.—The institute has arranged for a discussion on the national campaign for physical fitness to take place in the town hall, Darlington, on Friday, Jan. 21st, at 4.45 P.M. The discussion will be opened by Dr. G. A. Dawson, medical officer of health for Darlington. Dr. W. E. Orchard will describe the place of social hygiene, Dr. Isabel Brown the school medical services, and Dr. W. W. Forsyth the rôle of the general practitioner. On Saturday morning the members present will see a colour film of Darlington's health services, after which they will visit the health centre, the fever hospital, and an elementary school.

MEDICAL NEWS

University of London

At recent examinations the following candidates were successful :—

M.S.

Branch I (surgery).—G. S. Ferraby, King's Coll. Hosp.; K. L. James, Univ. Coll. Hosp. and Charing Cross Hosp.; and C. J. B. Murray, Middlesex Hosp.

Branch IV (laryngology, otology, and rhinology).—Maxwell Ellis, Univ. Coll. Hosp.

University of Leeds

Dr. Charles Ludwig has been appointed to a demonstratorship in physiology.

Royal College of Surgeons of England

On Jan. 17th Mr. J. Cole Marshall will give the first of a series of Hunterian lectures which will be held at the College at 5 P.M. on Mondays, Wednesdays, and Fridays till Feb. 16th. He will speak on the surgical treatment of detachment of the retina. The other lectures are as follows: Jan. 19th, Mr. R. T. Payne, cancer of the stomach as a surgical problem; 21st, Mr. R. C. Brock, the pathology, diagnosis, and treatment of intrapulmonary new growths; 24th, Mr. W. E. Underwood, recent observations on the pathology of hydronephrosis; 26th, Mr. J. I. Munro Black, the lympho-epitheliomata; 28th, Mr. Maxwell Ellis, the function of the bronchial tubes; 31st, Mr. T. W. Mimpriss, the treatment of retention of the testis; Feb. 2nd, Mr. Harold Rodgers, the endoscopic appearances of normal gastric mucosa and its variations in disease; 4th, Mr. T. F. Todd, rectal ulceration following irradiation treatment of carcinoma of the cervix (pseudo-carcinoma of the rectum); 7th, Mr. H. J. B. Atkins, chronic mastitis; 9th, Mr. T. Stewart Heslop, an experimental study of the neurogenic origin of peptic ulceration; 11th, Mr. P. B. Ascroft, an experimental study of the surgical treatment of arterial hypertension; 14th, Sir Arthur Keith, the prehistoric people of Mount Carmel; and 16th, Dr. W. E. Gye, some recent work in experimental cancer research.

Order of St. John of Jerusalem

The following promotions in and appointments to the Venerable Order of the Hospital of St. John of Jerusalem have been sanctioned by the King :—

As Commander.—Major-General E. W. C. Bradfield, C.I.E., O.B.E., M.S.; and Major-General Sir Frank Connor, F.R.C.S., K.H.S.

As Associate Commander.—D. H. Mehta, L.M. & S.; and Lieut.-Colonel K. K. Chatterji, F.R.C.S.I.

As Officer.—Major N. F. C. Burgess, M.D.; S. A. Wilkinson, M.R.C.S.; Lieut.-Colonel John Rodger, O.B.E., M.B.; Colonel N. M. Wilson, O.B.E., M.R.C.S.; Major-General E. A. Walker, C.B.E., F.R.C.S. Edin., K.H.S.; E. E. Dufty, L.M.S.S.A.; H. J. Paterson, C.B.E., M.D.; C. D. Newman, M.B.; J. F. Fitzmaurice, L.R.C.P.; Colonel J. A. S. Phillips, C.I.E., L.R.C.P. Edin.; Prof. W. I. Gerrard, O.B.E., F.R.C.P.; the Hon. Richard FitzGerald, M.D.; and J. S. Webster, M.D.

Medical Society of London

The second half of the 1937–38 session of this society will open on Jan. 10th with a pathological meeting. On Jan. 24th Dr. J. C. White (Massachusetts), Sir Thomas Lewis, F.R.S., Prof. E. D. Telford, and Prof. J. R. Learmonth will open a discussion on recent advances in surgery of the sympathetic nervous system. Other discussions and their openers will be: Dr. J. H. Douglas Webster, Dr. W. M. Levitt, and Dr. G. E. Vilvandré on what can be expected of deep X ray therapy; Prof. Henry Cohen and Mr. C. W. Bryan on the causes and treatment of flatulence; Dr. T. Izod Bennett, Mr. A. Dickson Wright, and Dr. W. G. Oakley on uræmia; and Dr. James Maxwell and Mr. R. C. Brock on diagnosis and treatment of lung abscess. The Lettsomian lectures will be held on Feb. 21st, March 2nd and 7th by Dr. George Graham, who is to give a survey of the changes and results of treatment of diabetes in the last fifteen years. Sir Henry Gauvain will deliver the annual oration on May 9th when he will speak on planning a hospital. The society may be addressed at 11, Chandos-street, W.1.

University of Calcutta

In connexion with the jubilee meetings of the Indian Science Congress Association the University is conferring honorary degrees on Prof. C. G. Jung, Dr. C. S. Myers, F.R.S., and Prof. U. Straub.

Radium

Treasury Order 1937, No. 11, continues the exemption of radium compounds from key industry duty till August 31st, 1938.

Medical Society of Individual Psychology

The annual dinner of this society will take place on Thursday, Jan. 13th, at 7.45 P.M., at the Florence Restaurant, Rupert-street, London, W. The principal guests will be Prof. John MacMurray and Dr. R. D. Gillespie.

Heberden Society

A quarterly meeting of this society will be held at 11, Chandos-street, London, W., at 8.30 P.M., on Thursday, Jan. 13th, when Dr. William Goldie, research fellow in rheumatism of the University of Leeds, will read a paper on *Streptococcus hæmolyticus* in the ætiology of rheumatic fever and rheumatoid arthritis. Dr. Mervyn Gordon, F.R.S., will also speak. The society, which was formed not long ago, is composed of clinicians who are or have been working at the British Red Cross Clinic, Peto-place, and its object is the study of the rheumatic diseases, mainly from their clinical aspect. A limited number of medical practitioners who have not worked at the clinic, but who are interested in the study of arthritis and allied conditions, may also be elected. Further particulars may be had from the hon. secretary, Dr. Kenneth Stone, 58, Chesterfield-house, London, W.1.

THE LANCET 100 YEARS AGO

January 6th, 1837, p. 522.

From a leading article.

IT may be safely assumed that the science of medicine would attain a much more sound and healthy condition than it now exhibits, were every veil and cloud of mystery removed from it, and the mass of the community accustomed to regard it simply as one of the inductive sciences . . . what we are desirous of seeing is an avoidance, on the part of all medical men, of that mysticism and secrecy in which medicine has hitherto been involved; we should wish to witness the triumph of common sense in the rejection of all words and terms of foreign and barbarous origin; we would admit the public, in part, at least, behind the scenes, and not by an affected employment of uncouth symbols, and unknown words, endeavour to give to the art of medicine a factitious degree of importance, and, as it were, sanctity, which every honest and true votary disclaims.

The progress of quackery, and the infatuated ignorance which prompts men to prefer the charlatan to the educated practitioner, have been the subject of long and loud complaint on the part of the profession. . . . It may be worth while to inquire how far the present progress of quackery may not have been promoted by the conduct of medical practitioners themselves. What is the essence of quackery? Secrecy. Without it the quack could not exist; mysticism and ignorance form the body and blood of quackery; ignorance on the part of the recipient; mysticism on the part of the distributor. If this view of the subject be true,—if, to use a professional phrase, we have discovered the morbid elements which constitute the disease, the discovery of a remedy and its application will not present obstacles of insurmountable difficulty. "Remove the cause and the effect ceases," is a well known medical adage. Remove ignorance from the people, and mysticism from the practice of medicine, and the quack's avocation will soon be gone.

Medical Diary

January 10th to January 15th

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
TUESDAY.
Therapeutics and Pharmacology. 5 P.M.
Dr. R. A. McCance: Analysis of Diets taken by Pregnant Women. Dr. Margaret Balfour: Effect of the Addition of Certain Concentrated Food Substances to the Diet of Pregnant Women in South Wales.
Psychiatry. 8.30 P.M.
Dr. L. C. Cook: Cardiazol Convulsion Therapy in Schizophrenia.
WEDNESDAY.
History of Medicine. 5 P.M.
Dr. J. R. Whitwell: General Paralysis: a Historical Survey.
THURSDAY.
Medicine. 8.30 P.M.
Dr. Francis M. Rackemann (Boston, U.S.A.): Certain Aspects of the Asthma Problem. Prof. L. J. Witts and Dr. E. R. Boland will also speak.
FRIDAY.
Ophthalmology. 8.30 P.M. (Cases at 8 P.M.)
Mr. R. Foster Moore and Mr. P. G. Doyne: The Determination of Disability Resulting from Industrial Diseases, excluding Miner's Nystagmus. Mr. R. Beatson Hird, Mr. Montague Hine, Mr. T. Harrison Butler, and Mr. T. Collyer Summers will also speak.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, W.
MONDAY.—8 P.M., Pathological Meeting.

LONDON JEWISH HOSPITAL MEDICAL SOCIETY, Stepney-green, E.
THURSDAY.—3.15 P.M., Dr. C. J. C. Britton, Dr. G. W. M. Findlay, and Dr. M. L. Rosenheim: The Present Status of Chemotherapy.

WEST KENT MEDICO-CHIRURGICAL SOCIETY.
FRIDAY.—8.45 P.M. (Miller General Hospital, S.E.), clinical evening.

PADDINGTON MEDICAL SOCIETY.
TUESDAY.—9 P.M. (Tuberculosis Dispensary, 20, Talbot-road, W.), Dr. Temple Grey: The Difficulties of Death Certification. Dr. F. C. Martley, Dr. Percy Stocks, and Mr. E. A. J. Heath will also speak.

SOUTH-WEST LONDON MEDICAL SOCIETY.
WEDNESDAY.—9 P.M. (Bolingbroke Hospital, Wandsworth Common, S.W.), Mr. E. D. D. Davis: Some Practical Points in the Diagnosis and Treatment of Sinusitis.

SOCIETY FOR THE STUDY OF INEBRIETY.
TUESDAY.—4 P.M. (11, Chandos-street, W.), Dr. W. Norwood East and Major W. H. Coles: Some Official Contacts with Addiction.

HARVEIAN SOCIETY.
THURSDAY.—8.30 P.M. (26, Portland-place, W.), annual general meeting. Dr. A. H. Douthwaite: Doctors and the Public. (Presidential address.)

BIOCHEMICAL SOCIETY.
FRIDAY.—4.15 P.M. (Lister Institute, Chelsea Bridge-road, S.W.), Short Communications and a Demonstration.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.
TUESDAY.—4.30 P.M., Prof. Arthur Ellis: Nephritis.
WEDNESDAY.—Noon, clinical and pathological conference (medical). 3 P.M., clinical and pathological conference (surgical). 3.30 P.M., Mr. Leslie Williams: Disproportion and Difficult Labour. 4.30 P.M., Dr. Cuthbert Dukes: Tumours of the Colon.
THURSDAY.—2.15 P.M., Dr. Duncan White: Radiological Demonstration.
FRIDAY.—2 P.M., clinical and pathological conference (obstetrics and gynæcology). 2.30 P.M., Mr. C. Naunton Morgan: Diseases of the Rectum.
Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics and operations, obstetrical and gynæcological clinics and operations.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.6.
MONDAY.—10 A.M., Dr. Post: X Ray Film Demonstration, skin clinic. 11 A.M., surgical wards. 2 P.M., operations, surgical and gynæcological wards, medical, surgical, and gynæcological clinics.
TUESDAY.—10 A.M., medical wards. 11 A.M., surgical wards. 2 P.M., operations, medical, surgical, and throat clinics.
WEDNESDAY.—10 A.M., children's ward and clinic. 11 A.M., medical wards. 2 P.M., gynæcological operations, medical, surgical, and eye clinics.
THURSDAY.—10 A.M., neurological and gynæcological clinics. Noon, fracture clinic. 2 P.M., operations, medical, surgical, genito-urinary and eye clinics.
FRIDAY.—10 A.M., medical wards, skin clinic. Noon, lecture on treatment. 2 P.M., operations, medical, surgical, and throat clinics.
SATURDAY.—10 A.M., children's and surgical clinics. 11 A.M., medical wards.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY to SATURDAY.—ST. JOHN'S HOSPITAL, 5, Lisle-street, W.C., afternoon course in dermatology (open to non-members).—NATIONAL HOSPITAL FOR DISEASES OF THE HEART, Westmoreland-street, W., all-day course in cardiology (open to non-members).

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle-street, W.C.
TUESDAY.—5 P.M., Dr. G. B. Dowling: Pityriasic Dermatitis.
WEDNESDAY.—5 P.M., Dr. I. Muende: Elements of Histopathology.
THURSDAY.—5 P.M., Dr. W. N. Goldsmith: Pigmentary Disorders.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
THURSDAY.—2 P.M., Dr. Reginald Lightwood: Care of the Premature Infant. 3 P.M., Mr. T. Twistington Higgins: Pyloric Stenosis and its Treatment.
Out-patient clinics daily at 10 A.M. and ward visits at 2 P.M.

ST. JOHN CLINIC AND INSTITUTE OF PHYSICAL MEDICINE, Ranelagh-road, S.W.
FRIDAY.—4.30 P.M., Dr. Albert Eidinow: Physical Medicine in Diseases of the Skin.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.
FRIDAY.—4 P.M., Mr. A. Lowndes Yates: Nasal Obstruction.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.
WEDNESDAY.—4.15 P.M. (Royal Infirmary), Dr. J. N. Cruickshank: Nephritis.

Births, Marriages, and Deaths

BIRTHS

CHANCE.—On Dec. 28th, at Dublin, the wife of Dr. Oliver Chance—a daughter.
DAVIDSON.—On Jan. 2nd, at Hartley, Plymouth, the wife of Dr. Stephen M. Davidson—a son.
EDEN.—On Jan. 2nd, at Heath-street, Hampstead, the wife of Mr. Kenneth Eden, F.R.C.S. Eng.—a daughter.
GIBSON.—On Dec. 24th, at St. Thomas's Hospital, the wife of Dr. Thomas Gibson—a daughter.
GRACE.—On Jan. 1st, at London, Ont., Canada, to the wife of Mr. Archibald J. Grace, F.R.C.S.—a son.
HOBDAY.—On Dec. 28th, at Yeovil, Somerset, the wife of Dr. F. T. J. Hobday—a daughter.
INGRAM.—On Dec. 24th, at the Middlesex Hospital, the wife of Mr. Peter Ingram, F.R.C.S.—a daughter.
MCNIE.—On Dec. 30th, at the British Military Hospital, Lahore, the wife of Captain T. McG. McNie, R.A.M.C.—a son.
RIVERS-MOORE.—On Dec. 28th, at Port Shepstone, South Africa, the wife of Dr. Francis Rivers-Moore—a son.
ROBERTSON.—On Dec. 30th, at Winchester, the wife of Dr. Kenneth Robertson—a daughter.
THORPE.—On Jan. 1st, at Cambridge, the wife of Dr. W. H. Thorpe—a daughter.

MARRIAGES

CLEMENTS—BARDSWELL.—On Dec. 29th, at Holy Trinity Church, Southport, Albert James Clements, M.B., to Jean Hamilton, only daughter of the late Hamilton Bardswell and of Mrs. Hamilton Bardswell, of Southport.
KERBY—AGNEW.—On Dec. 24th, at Durban, South Africa, Theodore Rosser Fred Kerby, M.R.C.S., to Mrs. Constance Mary Agnew, widow of Ewan Siegfried Agnew, Durban.
LEE—FISCHER.—On Dec. 21st, in Budapest, Ralph Owen Lee, F.R.C.S., of Northampton, to Szepesy Fischer (Clára), of Budapest.
SPENCER—RAM.—On Dec. 28th, in Sydney, N.S.W., Stanley Livingstone Spencer, F.R.C.S., to Doris Marion, only child of Capt. Percival Scott Ram, of Guildford, Surrey.

DEATHS

BLACK.—On Jan. 3rd, at Hurstpierpoint, Sussex, George Black, M.B. Lond., Major, R.A.M.C. (T.), aged 73.
BROUN.—On Dec. 26th, at Higher Woodway, Teignmouth, Lieut.-Colonel William Hamilton Broun, late R.A.M.C.
BULLMORE.—On Dec. 27th, at Sydney, Herbert Henry Bullmore, M.B., M.R.C.P. Edin.
CANT.—On Jan. 2nd, in Salford Hospital after a road accident, Frederick Vaudrey Cant, M.A. Camb., M.R.C.S. Eng., D.P.H., chief medical officer of Manchester Associated Collieries, aged 46.
CARLISLE.—On Jan. 2nd, Geoffrey Carlisle, M.R.C.S. Eng., retired Surg. Capt., R.N., son of the late Paymaster-in-Chief John Carlisle, R.N.
GRIFFIN.—On Dec. 26th, at Cliftonville, William Watson Griffin, M.B. N.Z., F.R.C.S. Eng.
HOLMES.—On Dec. 31st, Thomas Daniel Hill Holmes, M.D. Edin., J.P., of Woburn Sands, aged 71.
JAMESON.—On Jan. 2nd, at Fleet, Hants, Surg. Capt. Robert Dundonald Jameson, C.M.G., L.R.C.P. Edin., R.N., retd.
JOHNSTON.—On Dec. 29th, at Leadenham, Thomas Leonard Johnston, L.R.C.P. Edin., formerly medical superintendent of Bracebridge Mental Hospital, in his 75th year.
MAUNSELL.—On Dec. 29th, at Uxbridge, Major-General T. Maunsell, C.B., LL.D., A.M.S. (retd.), in his 99th year.
MILLSON.—On Jan. 3rd, at Angell-road, S.W., George Millson, O.B.E., M.R.C.S. Eng., late M.O.H., Borough of Southwark, in his 94th year.
MORGAN.—On Dec. 26th, David Morgan, M.B. Edin., of Heathcroft, Hampstead-way, N.W., ex-medical superintendent of the Cunard Line.
ORR.—On Dec. 27th, at Biarritz, A. W. Orr, M.D. Dubl., eldest son of the late Major A. Orr, R.A., aged 75.
SHIPTON.—On Dec. 28th, at Buxton, Arthur Shipton, F.R.C.S. Edin., J.P., aged 82.
SMITH.—On Dec. 30th, at Heavitree-road, Plumstead, Frank Wybourn Smith, M.R.C.S. Eng., aged 58.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

NOTES, COMMENTS, AND ABSTRACTS

COMPENSATION FOR SILICOSIS IN DIFFERENT COUNTRIES

THE International Labour Office has taken an interest in silicosis from its foundation. The latest publication on the subject[1] records the extent to which the principle of compensation for silicosis and allied diseases has been recognised throughout the civilised countries of the world. Compensation is provided by legislation for this most serious of all industrial diseases in Great Britain, Canada, Australia, New Zealand, and South Africa, in nearly all the countries of Europe, including the U.S.S.R., in the Americas and in Japan.

For illustrative purposes three systems of legislation are detailed, the special legislation in the Union of South Africa, the special schemes in Great Britain, and the schedule in Germany. The systems are divided, for purposes of comparison, under the following heads: legislation, scope of legislation, right to compensation, certification of the disease, benefits, review, procedure for settling disputes, administration of compensation, and prevention.

UNION OF SOUTH AFRICA

Compensation for silicosis is accorded in virtue of special Acts, consolidated and amended in 1925, and Government notices. The legislation applies only to scheduled gold-mines in the Witwatersrand and gazetted mines outside that area. The Minister of Mines decides on the places to which the Acts apply, and the Government mining engineer on the persons covered by them. The right to compensation is based on a diagnosis of silicosis with or without tuberculosis, and tuberculosis alone. Silicosis is recognised in three stages: ante-primary, primary, and secondary, according to the degree of incapacity or the appearance of tuberculosis. Tuberculosis of the lungs is recognised when open, or when closed, with serious impairment of working capacity. A claim for compensation is based on five years' work in a scheduled mine, and must ordinarily be submitted within five years of leaving the employment, but this rule is waived under certain conditions. Native workers have similar rights.

A claim for compensation on account of tuberculosis is based on employment for twelve months in a scheduled mine and a diagnosis of tuberculosis within twelve months of leaving it (in native labourers these periods are respectively one month and six months). In fatal cases compensation is payable to dependants. The certificates entitling to benefit are granted by the Miners' Phthisis Medical Bureau, and the claims are dealt with by the Miners' Phthisis Board. An appeal may be made from the decision of the Medical Bureau to the Medical Board of Appeal, whose decision is final. The system of insurance is based on the collective liability of employers, for native labourers the individual employer is responsible. Four distinct funds are maintained for meeting claims and expenses, including liabilities arising from mines which have closed down.

GREAT BRITAIN

Here compensation for silicosis is provided by various schemes applying to different industries or processes made under Section 47 of the Workmen's Compensation Act, 1925. Four separate schemes relate to metal grinding, refractories, sandstone, and various industries grouped together, including metalliferous and coal mining and other processes in handling silica in which there is exposure to the dust. The right to compensation is based on a diagnosis of silicosis, which is regarded as fibrosis of the lungs due to silica dust, as well as silicosis accompanied by tuberculosis; accordingly, the definitions of the processes covered by each scheme is related to exposure to the inhalation of silica dust.

Compensation is provided in respect of compulsory suspension from employment, disablement, or death, on account of silicosis or silicosis with tuberculosis (not for tuberculosis alone). Where the workman has been employed in the processes for not less than five years the disease is deemed to be due to the employment, otherwise the onus of proof is on the workman or his dependants. Application must be made within three years of leaving the employment (except in the refractories industries). Certificates entitling to compensation can only be granted by the Silicosis Medical Board, appointed by the Secretary of State; there is no appeal, but re-examinations are allowed after an interval. Certificates issued at the statutory periodical medical examinations, required in the refractories, sandstone, and pottery industries, are issued free, otherwise the workman pays a specified fee for examination. Certificates for fatal cases are in general issued only after a post-mortem examination. The benefits are substantially as in disablement or death from accidents or other industrial diseases. The amount payable for partial disablement varies with the degree of impairment of physical capacity. Compensation for silicosis is based on the principle of employers' liability. In the refractories and the sandstone industries the liability is collective; all employers have to subscribe to a general compensation fund. Under the other schemes the individual employer is liable and he may insure against his liability.

GERMANY

Silicosis is compensated in virtue of the third Order of Dec. 16th, 1936, relative to the extension of accident insurance to cover occupational diseases. The schedule appended to the Order includes (*a*) serious pneumoconiosis (silicosis), (*b*) pneumoconiosis (silicosis) occurring in conjunction with pulmonary tuberculosis when the general clinical picture is serious and the pneumoconiotic lesions constitute the essential cause of the active and progressive evolution of tuberculosis. The disease is compulsorily notifiable by the employer and the doctor who makes the diagnosis, to the accident association which is the institution responsible for insurance. Any medical practitioner who discovers the disease in a patient under his care or at a post-mortem examination is required to notify the case. (Similar notification is required in South Africa but not in Great Britain.) The notification goes finally to the factory inspector and the Government medical inspector, who has the patient examined at the expense of the accident association for an opinion on the connexion between the disease and the man's work.

Benefits are of two types: in kind (medical treatment, vocational rehabilitation, or training in a new occupation) or in cash. Cash benefits equal to half the basic wage are provided for forty-five days by the sickness fund and after that by the accident association. Pension (after six months) may amount to two-thirds of earnings or less according to loss of earning capacity. In fatal cases benefits are paid as pension to the dependants. The question of revision of pension can be raised by the workman or the accident association, and appeals are dealt with by the Federal Insurance Office. The financial resources of the accident association are derived from contributions from their members assessed annually on a system controlled by the Federal Insurance Office.

Measures for prevention of industrial diseases are initiated through the factory inspectorate as the result of notification by the medical attendant. The accident associations issue regulations to employers and workers for the prevention of occupational

[1] Workmen's Compensation for Silicosis in the Union of South Africa, Great Britain, and Germany. International Labour Office, Studies and Reports, Series F (Industrial Hygiene), No. 16, 1937. London: P. S. King and Son, 14, Great Smith-street, S.W.1. Pp. 147. 3*s*. 6*d*.

disease, and provide inspectors under official control to see that these are carried out.

APPENDICES

Over a third of this publication is devoted to seven informative appendices. These describe compensation of occupational diseases by the system of blanket coverage—the law in Wisconsin being taken as an example; the radiological technique and classification of silicosis; silicosis statistics; and a table showing the legislation in force for compensation for pneumoconiosis in some fifty different countries and States.

NARCOTIC DRUGS: THE WORLD'S REQUIREMENTS

THE supervisory body set up by the Convention of 1931 for controlling the distribution of narcotic drugs has issued a statement giving the estimated world requirements of dangerous drugs for 1938. The grand totals for morphine, heroin, and cocaine are, respectively, 45,638 kg., 1133 kg., and 5032 kg. It has, however, to be borne in mind that in the case of morphine the amount required for consumption as such is 10,126 kg., while no less than 35,395 kg. is utilised for conversion into other drugs, such as codeine and dionine. A comparison of the approved estimates for the years 1934–38 shows the figure for morphine to be fairly constant at about 9000–10,000 kg., with heroin about 1000 kg. and cocaine 4000–5000 kg. Several countries party to the 1931 Convention are remarkably remiss in furnishing their estimates—notably Cuba, Mexico, Peru, Panama, and Ecuador. In these cases the supervisory body is authorised, under Article 5 of the Convention, itself to prepare the estimates for such countries.

The tables annexed to the statement exhibit interesting variations in the estimates vouchsafed: in Europe the largest consumers of morphine are Soviet Russia, Germany, and France; in Asia the largest consumer is Japan, while the United States of America supply the highest estimate for morphine for 1938 of any country—namely, 8653 kg. In the case of heroin, on the other hand, the United States' estimate is nil; that of Soviet Russia heads the list with 350 kg., followed by Japan 180 kg., and Italy 171 kg. The figures for Great Britain are of morphine 2114 kg. and heroin 56 kg.

The Permanent Central Opium Board, which met in Geneva in November last under the chairmanship of Mr. Lyall, reviewing the work of 1937 up to the date of its meeting, called attention to absence of information from Iran in regard to raw opium, although that country is one of the greatest producing countries of the drug. Likewise Bolivia and Peru failed to supply information in regard to their stocks of coca leaves, of which they are two of the largest producers. The Board says that though seizures of morphine in recent years have not been of great importance "it would be dangerous to conclude that the illicit traffic is also negligible."

ANTI-SYPHILIS PROPAGANDA

NOBODY will question the wisdom of spreading light about syphilis though there may well be differences of opinion as to how this may best be achieved. Propaganda, if it is to be read at all, must catch the eye, and so far the writers and publishers of two recent "popular" books on syphilis may be forgiven, the one for an alarmist title, the other for a lurid cover. Dr. Becker's book[1] is short and simple. He pleads for a broader view about syphilis, and outlines its history, course, and cure. He has a chapter on the causal organism and another on what he calls "pre-natal" syphilis, a term he prefers to "congenital" on what seem hair-splitting grounds. All this is unexceptionable, but a chapter entitled "How they get it" strikes a terroristic note by its undue insistence on the possibility of innocent infection. By way of illustration the author quotes two cases from his own experience, one of a man who was infected by a blow from the fist of a syphilitic, and the other of a child infected by eating an apple polished with the infected sputum of a street vendor. Now it is not denied that such things do happen but, like lonely people who keep a frog, they must be extremely rare, and there can be no point in stressing them in a work intended for the layman. Dr. Breger's book[2] is even more alarming. On the cover is depicted a green-headed snake, presumably symbolising the *Spirochæta pallida*, which is held by the neck in the vice-like grip of (no doubt) a heroic syphilologist about to administer a full dose of neo-arsphenamine. The book itself is full of simple graphs and diagrams, macabre posters and coloured plates, and contains one particularly revolting photograph of a nude mercifully blindfold and covered with a rash. By appealing to fear rather than to common sense the authors in our view weaken their case and fail in a large measure to do what they set out to do. Propaganda along these lines is surely less likely to impel ths syphilitic to seek early medical aid than to foster the growth of syphilophobia, a disease which once implanted, as every practitioner knows, is as hard to eradicate as a fear of cancer and the cause of as much needless suffering.

SPERMATIC ABNORMALITIES

IN the investigation of male fertility most progress is at the moment being made by semen analysis. It was Moench, in 1928, who first called attention to the importance of estimating the ratio of abnormal to normal spermatozoa, and he concluded that a coefficient of variability in excess of 11·5 means disturbance in spermatogenesis. Dr. W. W. Williams, who writes on this subject in the *New England Journal of Medicine* for Dec. 9th last, concerns himself with more common forms of abnormal spermatozoa and groups them under five headings: (1) spermatozoa with pyriform heads; (2) microspermia; (3) megalospermia; (4) spermatozoa with abnormalities of the acrosome; and (5) miscellaneous types. The aim of his investigation has been to provide a classification that will give comparable results in the hands of different observers, so that the relation of spermatic structure to function may be better appreciated.

THE HANDBOOK OF THE KITCHENETTE

Miss Bond[3] does not admit that the tin-opener is the badge of a lazy housewife; she champions the thoughtful use of canned foods as a means to relieve the busy woman of much of the drudgery of preparing, cooking, and washing up of meals, and very well she puts her case. The booklet is very practical and most of it is taken up with information about the varieties of foods canned, recipes for using such foods, detailed kitchen lore and kitchen planning, but Miss Bond finds space for some elementary dietetics and facts as to the safety and wholesomeness of canned foods. Naturally she is partisan but scientific knowledge is on her side in asserting that the nutritive value and safety of canned foods is not less and may be greater than that of uncanned foods. What the book does not contain is any comparison of the cost of fresh and canned foods, allowing of course, as is proper, for the cost of preparation. For the salaried woman worker living alone the book will be invaluable since the actual cost of foodstuffs, if the differences are small, is far less important than the question of labour and convenience. For working-class families

[1] Ten Million Americans Have It! By S. William Becker, M.S., M.D., associate professor of dermatology and syphilology, University of Chicago. London: J. B. Lippincott. 1937. Pp. 220. 6s.

[2] Die Geschlechtskrankheiten. By Dr. med Johannes Breger, Oberregierungsrat i.R., Leiter der Ortsgruppe Berlin der deutschen Gesellschaft zur Bekämpfung der Geschlechtskrankheiten. Berlin: R. v. Decker's Verlag G. Schenck. 1937. Pp. 150.

[3] Janet Bond's Book. A practical guide to the use of canned foods. Published by the Canned Foods Advisory Bureau Ltd. Free.

where every penny counts the cost factor is the main consideration. The place that canned foods can legitimately occupy in the dietary of the working classes is not considered by Miss Bond. For some foods they are probably economical, for others not. A careful comparison of the relative cost of the common fresh and canned foods as they reach the table is a piece of work that needs to be done.

DEDUCTIONS FROM INCOME TAX

FEW practitioners have time to study the complications of income tax law. Those who want to know the deductions chargeable against profits by a professional man will find in a little book recently published [1] concise and practical advice about the allowance of such expenditure as subscriptions to defence societies or to professional journals; the purchase of periodicals for the waiting-room; the deductions permissible where the doctor has a consulting-room and waiting-room in the house in which he lives; or, if he has a separate surgery, the allowance of a reasonable proportion of domestic expenditure. Under this last heading the telephone bill, for instance, may be largely treated as a charge against profits. The professional man must often be unaware of deductions which he is perfectly entitled to make. Within its own range Mr. Adlard Coles and Mr. Macdonald can fairly claim that their book justifies its title.

REPORT ON SISTER KENNY'S TREATMENT OF PARALYTICS

IN June, 1935, at the request of the Minister of Health for New South Wales, a clinic was opened at the Royal North Shore Hospital in Sydney to give Sister Kenny an opportunity of carrying out her method of treating cases of various types of paralysis under medical supervision. Her method consists essentially in early passive movements, graduated exercises, massage, and hydrotherapy, and in dispensing with splints. A committee of the hospital staff, with Dr. W. W. Ingram as chairman, was appointed to investigate her results, and their interim and final reports as submitted to the Minister are now published.[2] Sister Kenny selected 15 patients for investigation, including 10 cases of infantile paralysis of from 7 months to 15 years' duration, and 5 of cerebral diplegia. These patients had been under treatment at her clinic for from one to eleven weeks before the committee examined them. None of them had been consistently under the care of an orthopædic surgeon before that, and their previous treatment appears to have been quite inadequate. A careful assessment of the muscle power and degrees of deformity of these patients was made by the committee and re-examinations were carried out after from five to fourteen weeks treatment, and again about three months later. The period of observation was too short for any very definite conclusions to be arrived at, but the committee found that 8 of the 10 cases of infantile paralysis showed some improvement in muscle power, though most of the completely paralysed muscles were unchanged; there was a general improvement in the tone of muscles not paralysed, and in some patients deformities and stiffness of joints became less marked. All the cases of cerebral diplegia were improved, especially in regard to incoördination and involuntary movements; the children were calmer and less emotional, muscular hypertonicity was generally less, and the range of movement at a number of joints had increased. The committee concluded, however, that these 15 patients had not improved either more quickly or more extensively than would have been expected with orthodox methods. They agreed that Sister Kenny had not introduced any new principles except the absence of splinting, and that the effects of this could not be determined until a sufficient number of acute cases had been followed up over a long period and compared with controls. The committee expressed the belief, however, that efficient splinting as well as re-education of muscles under expert supervision is desirable. They noted that Sister Kenny had rendered a useful service by drawing the attention of the government and the public to the need for some general orthopædic scheme in Australia, and suggested that her trainees might well play a considerable part in such a scheme.

AIR-RAID PRECAUTIONS IN SCHOOLS

Circular 1461 (price 1*d.*) issued by the Board of Education, after consultation with the Home Office, suggests the precautions to be taken in schools in the event of an air-raid. Each authority is to decide for itself whether the schools are to be closed or not during the time that raids are to be expected. The children's safety comes first, but the public should not be unsettled by unnecessary dislocation of normal services. In districts that are safer than the children's homes, schools, especially boarding schools, should remain open. If the position of a school is so dangerous that it must be closed, arrangements ought to be made for affiliation with a better-placed neighbour. Schools should only be used as first-aid posts if other buildings are not available and alternative provision should then be made for continuing education. Plans for an emergency should be worked out in advance and made known to the teachers, a proportion of whom ought to learn the elements of first-aid and anti-gas measures, but they need not try to become experts. Children attending schools that are kept open are to carry their respirators to and from school. Instructions in peace time about using these are thought undesirable, for there will be ample opportunity under the arrangements made for the rest of the family. Where the danger is great children should be kept at home to share in the measures for protecting the general public, since the warning period is not expected to be more than 10 minutes. School buildings do not lend themselves to the structural changes required for protection because these would interfere with the free lighting and ventilation. Exceptionally, however, shelter trenches or rooms prepared against gas or splinters from bombs might be provided.

MATERNAL DEATHS IN AMERICA

UNDER the auspices of the Commonwealth Fund Dr. Iago Galdston, secretary of the medical information bureau of the New York Academy of Medicine, has written a little book [1] intended for laymen which is based primarily on the Report on Maternal Mortality in New York City published by the Fund in 1933.[2] This report showed that during the years 1930 to 1932 no less than 65·8 per cent. of the 2041 deaths in the city were preventable. Some striking figures are given; for example, that the attendant at 56·6 per cent. of the fatal cases was an obstetrician, at 28·3 per cent. a general practitioner, and at 10 per cent. a midwife. The number of cases attended by each of these classes is not given, nor the criterion for giving any doctor the title of obstetrician. The position of midwives in New York seems to be similar to that in England before 1902. No mention is made of the results obtained in countries where properly trained and properly controlled midwives conduct the majority of normal labours. The danger of inefficient maternity hospitals is stressed and a list of essential requirements for a maternity unit is given. In New York and Philadelphia no less than 70 per cent. of deliveries occur in hospital, and the available evidence suggests that widespread

[1] Income Tax Explained. By K. Adlard Coles, M.A., F.C.A., and John Macdonald, M.A. London: Jordan and Sons. 1937. Pp. 181. 5*s.*

[2] *Med. J. Aust.* Nov. 13th, 1937, p. 888.

[1] Maternal Deaths—The Ways to Prevention. New York: The Commonwealth Fund; London: Humphrey Milford, Oxford University Press. 1937. Pp. 115. 3*s.* 6*d.*

[2] See *Lancet*, 1934, **1**, 135.

hospitalisation increases the death-rate from sepsis and decreases the rate from other causes. In one hospital 50 per cent. of the patients in private wards were delivered with the aid of instruments, while in the public wards of the same hospital the corresponding figure was 4 per cent. The author suggests that the present generation has not produced a race of mothers different biologically from their predecessors but a different race of obstetricians. The author does not apportion the blame for the 50 per cent. forceps rate and 5 per cent. Cæsarean rate wholly to the medical profession but realises and explains the danger of interference by the patient or her friends with the judgment of the doctor. Excluding abortions and ectopics, 45 per cent. of the deaths followed operative delivery and 20 per cent. followed Cæsarean section. The conclusion reached is summarised as follows: "There are in this problem of maternal mortality many interdependent factors, but two amongst these factors stand out most prominently. Behind much of bad obstetrics are bad economic conditions, affecting physician and patient alike; and better instruction is needed by various groups—and most emphatically by the public."

Appointments

EDWARDS, COLIN, M.B. Sydney, M.R.C.P. Lond., D.P.M., Hon. Assistant Physician to the West End Hospital for Nervous Diseases, London.

Certifying Surgeons under the Factory and Workshop Acts: Dr. W. J. S. FITZMAURICE (Studley District, Warwick); Dr. C. S. APPLEYARD (Bedworth District, Warwick).

Vacancies

For further information refer to the advertisement columns

Barnsley, Beckett Hosp. and Dispensary.—H.P., £200.
Belgrave Hosp. for Children, Clapham-road, S.W.—Asst. Physician, 50 guineas.
Birkenhead Municipal Hosp.—Deputy Med. Supt., £450.
Birmingham, Children's Hosp.—Receiving Room Officer, £250. Res. Sen. Cas. H.S., £125. Also First Asst. to Orthopædic Dept., £100.
Birmingham City Education Committee.—Asst. School M.O., £500.
Blackburn County Borough.—Asst. M.O.H. and Asst. School M.O., £600.
Bolingbroke Hosp., Wandsworth Common, S.W.—H.P., at rate of £120.
Bootle General Hosp.—H.P., two H.S.'s, and Cas. O., each at rate of £150.
Bradford, Royal Eye and Ear Hosp.—H.S., £180.
Bristol Royal Infirmary.—Sen. Cas. H.S. and Sen. Obstet. H.S., at rate of £150 and £100 respectively. Also H.P.'s and H.S.'s, each at rate of £80.
Bristol, Southmead Municipal General Hosp.—Jun. Asst. Res. M.O., at rate of £200.
Cambridge, Addenbrooke's Hosp.—Hon. Dental Surgeon.
Cardiff, Welsh National School of Medicine.—David Davies Professorship of Tuberculosis, £1500.
Charing Cross Hosp., W.C.—Res. House Anæsthetist and Asst. Cas. O., £150.
Cheshire, St. Anne's Home, Altrincham.—Res. Surg. O., £200.
Chesterfield, Walton Sanatorium.—Jun. Res. Asst. M.O., £350.
Colchester, Severalls Mental Hosp.—Asst. M.O., £510.
Dagenham Urban District Council.—Asst. M.O.H., £600.
Dartford Rural District Council.—Part-time M.O., at rate of £250.
Devonport, Prince of Wales's Hosp.—Jun. H.S., at rate of £120.
Durham County Hosp.—H.S., at rate of £150.
Ealing Borough.—Asst. M.O., £600. Res. Asst. M.O., £350. Also Ophth. Surgeon, £275.
East Ham Memorial Hosp., Shrewsbury-road, E.—Res. M.O., at rate of £200.
Evelina Hosp. for Sick Children, Southwark, S.E.—H.P., at rate of £120.
Golden-square Throat, Nose, and Ear Hosp., W.—H.S., £100.
Grimsby and District Hosp.—Sen. and Jun. H.S.'s, at rate of £200 and £150 respectively.
Guildford, Royal Surrey County Hosp.—H.S., at rate of £150.
Hampstead General and N.W. London Hosp., Haverstock Hill, N.W.—H.P. and H.S., each at rate of £100.
His Majesty's Colonial Service.—M.O.'s, £600–£700. Also Asst. Med. Supt. for Central Mental Hosp., Tanjong Rambutan, £840.
Hosp. for Sick Children, Great Ormond-street, W.C.—Cas. M.O. at rate of £175.
Hove General Hosp.—Hon. Clin. Assts. for Gynæcological Dept and Ear, Nose, and Throat Dept.
Huddersfield, St. Luke's Hosp.—Res. M.O., £230.
Infants Hosp., Vincent-square, Westminster, S.W.—Res. M.O. £300.
Islington Metropolitan Borough.—Asst. M.O., £600.
Kidderminster and District General Hosp.—Jun. H.S., £100.
King's College Hosp., Denmark-hill, S.E.—Asst. Physician.
Leeds City.—Asst. M.O., £500.
Leeds, Killingbeck Sanatorium.—Sen. Asst. Res. M.O., £425.
Leicester, City Mental Hosp., Humberstone.—A.M.O., £350.
Leicester Royal Infirmary.—Res. Anæsthetist, at rate of £150.
Liverpool Dental Hosp., Pembroke-place.—Hon. Anæsthetist.
Liverpool School of Tropical Medicine.—Asst. Lecturer in Dept. of Entomology, £400.
London County Council.—Asst. Pathologist, £650.
London Hosp., E.—Med. First Asst. and Reg., £300. Also First Asst. to Dept. of Thoracic Surgery, £150.
London Jewish Hosp., Stepney Green, E.—Surg. Reg., 60 guineas.
London University.—University Chair of Medicine at St. Bartholomew's Hospital Medical College, and University Chair of Surgery at University College Medical School, each £2000. Also University Readership in Medical Parasitology at London School of Hygiene, £900.
Maidstone, Kent County Ophthalmic and Aural Hosp.—Ophth. H.S., at rate of £200.
Manchester, Ancoats Hosp.—Pathologist and Radiological Officer, each £400.
Manchester Northern Hosp., Cheetham Hill-road.—Res. H.P. and Res. H.S., each at rate of £100.
Metropolitan Hosp., London, E.—Hon. Anæsthetist, £25.
Middlesbrough Education Committee.—Asst. School M.O., £500.
National Temperance Hosp., Hampstead-road, N.W.—Hon. Anæsthetist. Hon. Ophth. Surgeon. Also Med. Reg., 40 gns.
Northampton, St. Andrew's Hosp. for Mental Diseases.—Res. Med. Supt., £2000.
Norwich, Norfolk and Norwich Hosp.—H.S. to Special Depts. and General H.S., at rate of £160 and £120 respectively.
Plymouth, Prince of Wales's Hosp., Greenbank-road.—H.S., at rate of £120.
Poplar Hosp. for Accidents, East India Dock-road, E.—Second Res. O., at rate of £175.
Preston, County Mental Hosp., Whittingham.—Res. Jun. Asst. M.O., £500.
Preston, High Carley Sanatorium, Nr. Ulverston.—Jun. Asst. M.O., £300.
Richmond Royal Hosp., Surrey.—Jun. H.S., £100.
Royal Air Force.—Temporary Civilian Dental Surgeons.
Royal Cancer Hosp., Fulham-road, S.W.—Res. M.O., £200.
Royal Masonic Hosp., Ravenscourt Park, W.—Res. Surg. O., at rate of £250.
Royal National Orthopædic Hosp., 234, Great Portland-street, W.—Two H.S.'s for Country Branch, each at rate of £150.
Royal Naval Medical Service.—M.O.'s.
St. Thomas's Hosp., S.E.—Asst. Physician to Dept. of Psychological Medicine.
Sheffield Royal Infirmary.—Sen. Cas. O. and H.P., at rate of £150 and £80 respectively.
Southend-on-Sea General Hosp.—First H.S., at rate of £100.
South Shields, Ingham Infirmary.—Jun. H.S., £150.
Stafford, Coton Hill Mental Hosp.—Asst. M.O., £400.
Stockport Infirmary.—Res. Surg. O., £250.
Taunton and Somerset Hosp.—H.S., £125.
Tunbridge Wells, Kent and Sussex Hosp.—H.S. to Ear, Nose, and Throat Dept. and Res. Anæsthetist, £150.
Victoria Hosp. for Children, Tite-street, Chelsea, S.W.—Ophth. Surgeon. H.P. and H.S., each at rate of £100. Also Out-patient Anæsthetist, 10s. 6d. per attendance.
West Bromwich, Hallam Hosp.—H.P., at rate of £200.
West End Hosp. for Nervous Diseases, 73, Welbeck-street, W.—Hon. Med. Psychologists. Two Res. H.P.'s, each £125. Also Registrar to Out-patient Dept., £200.
Wolverhampton and Midland Counties Eye Infirmary.—H.S., £150.
Wolverhampton Royal Hosp.—Asst. Res. M.O. for Gynæcological and Obstet. Dept., at rate of £100.

The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Worthing (Sussex) and Sheffield (East) (Yorks, W.R.).

CAIRO OPHTHALMOLOGICAL CONGRESS.—The fifteenth Concilium Ophthalmologicum was opened in the new university building at Cairo by King Farouk I on Dec. 7th, when Dr. A. H. H. Sinclair (Edinburgh) spoke for the representatives of Great Britain. Discussions went on for the following week, the leading subjects being arterial hypertension of the retina, opened by Drs. Wagener and Keith (U.S.A.), and endocrinology of the eye, opened by Prof. I. Snapper (Amsterdam). About a hundred papers were read in all. Visits were paid to the Memorial Ophthalmic Laboratory at Giza where trachoma and spring catarrh especially are being studied under the direction of Dr. R. P. Wilson, and the view is gaining ground that trachoma is a virus disease, possibly some form of rickettsiosis; and to No. 1 Ambulatory Hospital situated near the Citadel, staffed entirely by Egyptian oculists, which moves from village to village in a campaign against trachoma and ophthalmia.